

Lighthouse (aka Watchtower) Pilot in Global SP Caseload Global Risk & Fraud Pattern Detection

Operations Planning and Performance Branch
Data Executive Steering Committee (DESC) Meeting

June 2021

Purpose

1. Provide an overview of the A2SC-developed “Lighthouse” Risk Identification System (previously known as “Watchtower”).
2. Outline plans for an operational pilot to improve integrity and fraud detection in the global Student Permit (SP) caseload.

What is Lighthouse (a.k.a. Watchtower)?

Lighthouse is a prototype system that automatically and comprehensively extracts risk and fraud patterns from data, providing timely and actionable information to IRCC.

**It DOES NOT recommend or make an administrative decision about a client:
*Lighthouse shines a light on potential concerns, but humans still steer the ship***

Value Proposition of Lighthouse

Flexible	Built in-house and is readily adaptable to other IRCC business lines
Comprehensive	System can scan for almost all forms of data-detectable risk patterns, and be configured for specific risk types (e.g., misrep, organized crime, etc.) or countries
Proactive	Able to identify new risk patterns, thus enabling Risk Assessment Units (RAUs) to proactively select cases for verifications, based on previous indicators
Effective	Enables RAUs and investigative teams to be more efficient and effective in identifying, validating and taking action on fraud and risk patterns
Improve Processing	Can contribute to improving processing speed of bona-fide applications
Cost Savings	Cost avoidance from fewer adverse events (e.g., each asylum claim costs the federal government roughly \$16,000)
Complementary	Dovetails with existing intelligence-based risk detection approaches
Inexpensive	Modest costs for development and maintenance. Immediately deployable using existing infrastructure

EVALUATION, OPERATIONAL PILOTS & NEXT STEPS



Evaluation: Early Pilot in July 2020 on SP

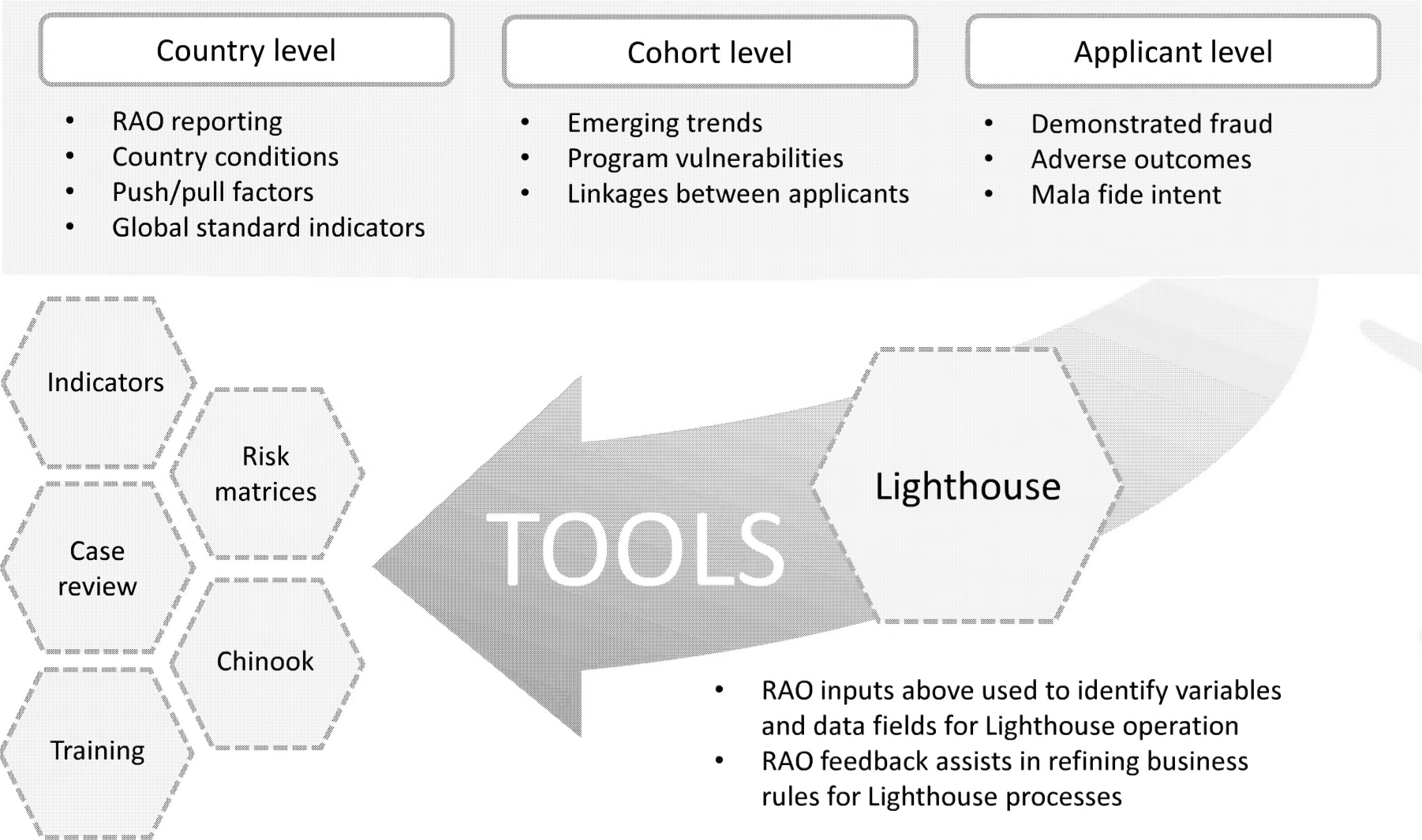
- In July 2020, an early version of the system was briefly piloted for SP risk pattern/indicator detection, as a joint testing effort with teams from IN, DN, CN, IRM, and IPG.
- Information on patterns and matching applications from the global SP **inventory** were shared with RAUs, who used it as **one factor** in their decision process for assessing when verifications should be performed.

KEY RESULT:

Detection of adverse findings more than doubled when verifications were informed by Lighthouse

*Adverse rates rose to **18%** with Lighthouse, compared to **8.5%** without Lighthouse.*

Lighthouse aligns with Risk Intelligence suite of activities



SUCCESS STORY:

DELHI investigation of SP applications destined to Quebec DLIs (Feb 2021)

- Lighthouse was leveraged to support a QA exercise relating to concerns on ten DLIs.
- Stakeholders chose a single pattern to explore as a starting point to narrow their QA exercise looking into potential fraud.
- Their exercise identified concerns in this caseload,

New Spring 2021 SP Pilot (Pending Approval)

The new pilot, to be launched in June 2021, will use Lighthouse to identify relevant risk patterns for RAUs on **new** SP applications to improve processing.

Lighthouse will be **one factor** informing RAO decisions about when to conduct verifications of a client’s documents.

Two key objectives for the pilot:

- **Try a new business process:** Before we can deploy the tool permanently, Ops needs to learn how to enable coordinated, Lighthouse-supported verification activities across the three Networks.
- **Better assess risks arising from the use of the tool:** The July 2020 pilot was too short to allow Ops to identify unforeseen risks which may occur in the use of Lighthouse, and to implement mitigations for these risks

TIMELINE AND TARGET VOLUMES

PILOT DATE	PILOT LENGTH	TARGET VOLUMES
June –Oct 2021 (TBC)	18 weeks	Lighthouse information will be provided on <u>50-100 applications/week (900-1800 total)</u> to IN, CN and/or DN RAUs, to support their decisions regarding whether to perform supporting document verification activities

Pilot Considerations: System complements human decision making

System provides neutral, factual information to increase evidence available to officers

- Lighthouse only provides information to support RAU decisions (not frontline officers) about when to collect additional evidence through a verification.
- Pattern information is never based on sensitive/protected variables (gender, age, marital status, family name).
- System identifies organized fraud, not broad risk profiles.
- No decision automation.

Lighthouse is never used directly in application decisions

- No application decision is ever based on information extrapolated from other applications or a past trends, only direct evidence collected from the specific applicant.

The pilot is designed to avoid fettering

- Frontline officers will not see Lighthouse pattern information and will not know which applications are involved in the pilot.

Key Design Principle #1:

Lighthouse does not make recommendations or automate decisions

Key Design Principle #2:

Lighthouse identifies risk information that can stand on its own merits to support human decision making

Pilot Considerations: “Do No Harm” design

“Do No Harm” design attempts to eliminate the potential negative impact of a “false positive” of Lighthouse. This is a key risk and bias mitigation.

False positive = Lighthouse information leads to a verification being conducted that comes back as non-adverse (documents are authentic).

We avoid harm in two ways:

- 1) No processing delay.** By moving verifications to earlier in the process, before frontline officers touch the application, we expect to avoid creating delays.
- 2) Likelihood of approval is not negatively affected.** The data shows that applications with a non-adverse verification generally have similar or higher approval rates than those that never had a verification performed.

Key Design Principle #3:

When a Lighthouse-informed verification comes back as non-adverse, this should have no negative impact on the client.

Potential Issues and Risks For Consideration

TBS Directive on Automated Decision Making doesn't apply

But we still need to manage IRCC governance around algorithmic decision-making

Need to continue to work with Legal

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Strong communication Plan required

- The use of Lighthouse in this pilot may be covered in the media
- Lighthouse-related information will be added to the information on advanced analytics in the upcoming Digital Transparency page of the IRCC website

Business owner will need to be identified to strengthen accountability

SP Pilot – Work Completed to Date

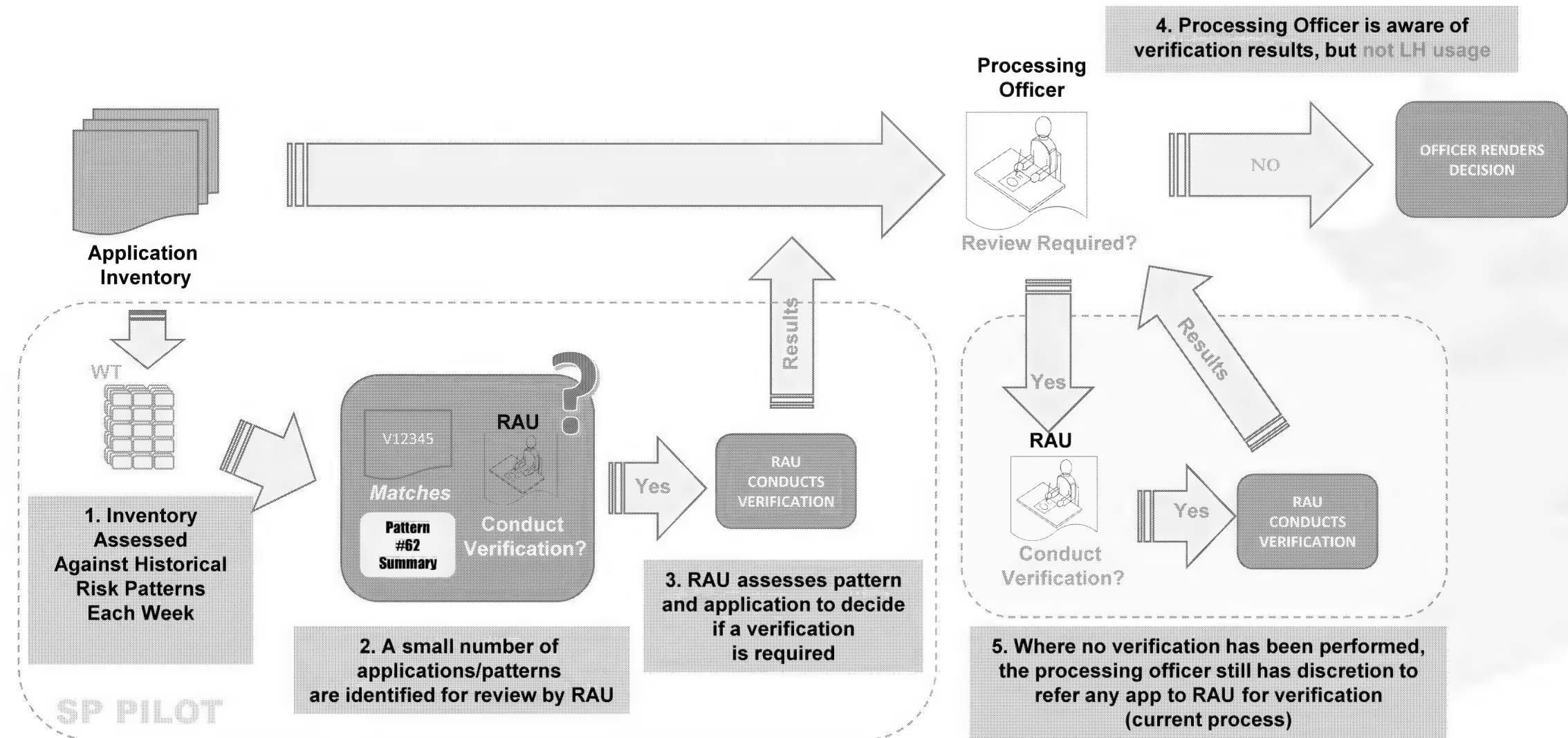
Deliverable (Leads)	Status
Technical System Design Report & Model Development (A2SC)	Completed
Pilot Project Charter (A2SC)	Completed
Model Privacy Assessment (ATIP)	Draft Completed
Risk and Mitigation Analysis (A2SC)	Completed
Peer Review (Statistics Canada)	Review Completed, Response Drafted
Governance Working Group (A2SC, IRM, IPG, CN, DN, IN, Legal, Privacy, SPP, CMB, Admissibility)	Conducted November 2020-January 2021
Governance Framework (IRM)	Draft Completed
Review of System Inputs/Outputs & Sample Pattern Reviews (Networks, IRM, Legal)	Completed
Project Design Team (CN, IN, DN, IRM, A2SC)	Ongoing Meetings Since Jan 2021
Other Stakeholder Consultations (CBSA, GBA+, Comms)	<u>Early conversations only</u>
Bias Assessment (A2SC)	Initial analysis performed and mitigations planned

SP Pilot – Next Steps

Deliverable (Leads)	Status
Finalize instructions to participating RAUs and frontline officers (A2SC, IN, CN, DN)	To complete pre-launch
Update risk patterns to be used in pilot (A2SC)	To complete pre-launch
Review risk patterns to be used in pilot (Networks, IRM, Legal)	To complete pre-launch
Bias assessment on risk patterns to be used in pilot (A2SC, SPP, GBA+)	To complete pre-launch
Develop and implement communications/transparency plan (Comms)	To complete post-launch
Weekly monitoring of activity and results on applications flagged by Lighthouse <i>Includes monitoring of false positives for evidence of bias in specific patterns</i>	To complete post-launch

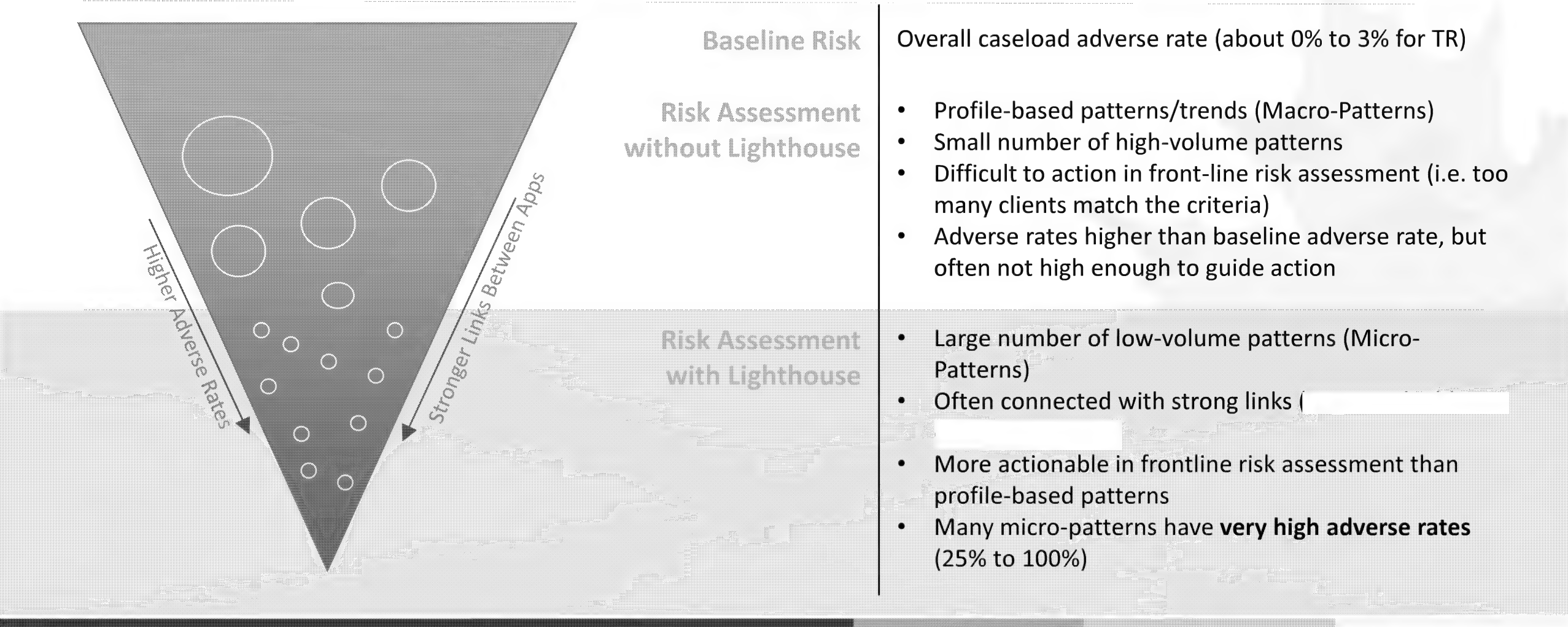
The pilot was already endorsed by the Integrated Network Steering Committee (INSC) on May 13

Annex 1: Integrating Lighthouse into Processing



Annex 1: Targeted Risk Assessment with Lighthouse

Focuses on adverse outcomes (e.g. criminality), **not** approval/refusal of the application



s.16(1)(b)

s.21(1)(a)

s.21(1)(b)

Annex 2: Other Use Cases of Lighthouse

Lighthouse has been proposed for various other use-cases, including:

Sub-Saharan Africa TRV/SP/WP Pilot with IN, Digital Journey Lab, and Chinook 1.5

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Global SP Pilots

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Global TRV Pilot with Chinook

Develop Lighthouse Prototype for WP

Annex 3: Participating Teams

Engaged Stakeholders

International Network (IN)

Domestic Network (DN)

Centralized Network (CN)

Integrity Risk Management (IRM)

Immigration Program Guidance (IPG)

Legal Services (Department of Justice/LSU)

Privacy (ATIP)

Strategic Planning and Performance (SPP)



Annex 4: Mitigation of Bias/Discrimination

- A2SC goes to great lengths to ensure that Lighthouse is developed responsibly and does not introduce bias.
- Steps include:
 1. External review of Lighthouse by Statistics Canada
 2. Following best practices in data science to avoid bias and active monitoring of risk indicators
 3. Many layers of human review of the risk patterns to eliminate incremental bias
 4. Overall design centred on the interests of the client to avoid causing harm
 5. Active engagement with external stakeholders, including governance exercise in Winter 2020
 6. Follow the comprehensive ethics framework to govern AA work

Business Case for Investment in Advanced Analytics

OPP-BRIA
May 29, 2017

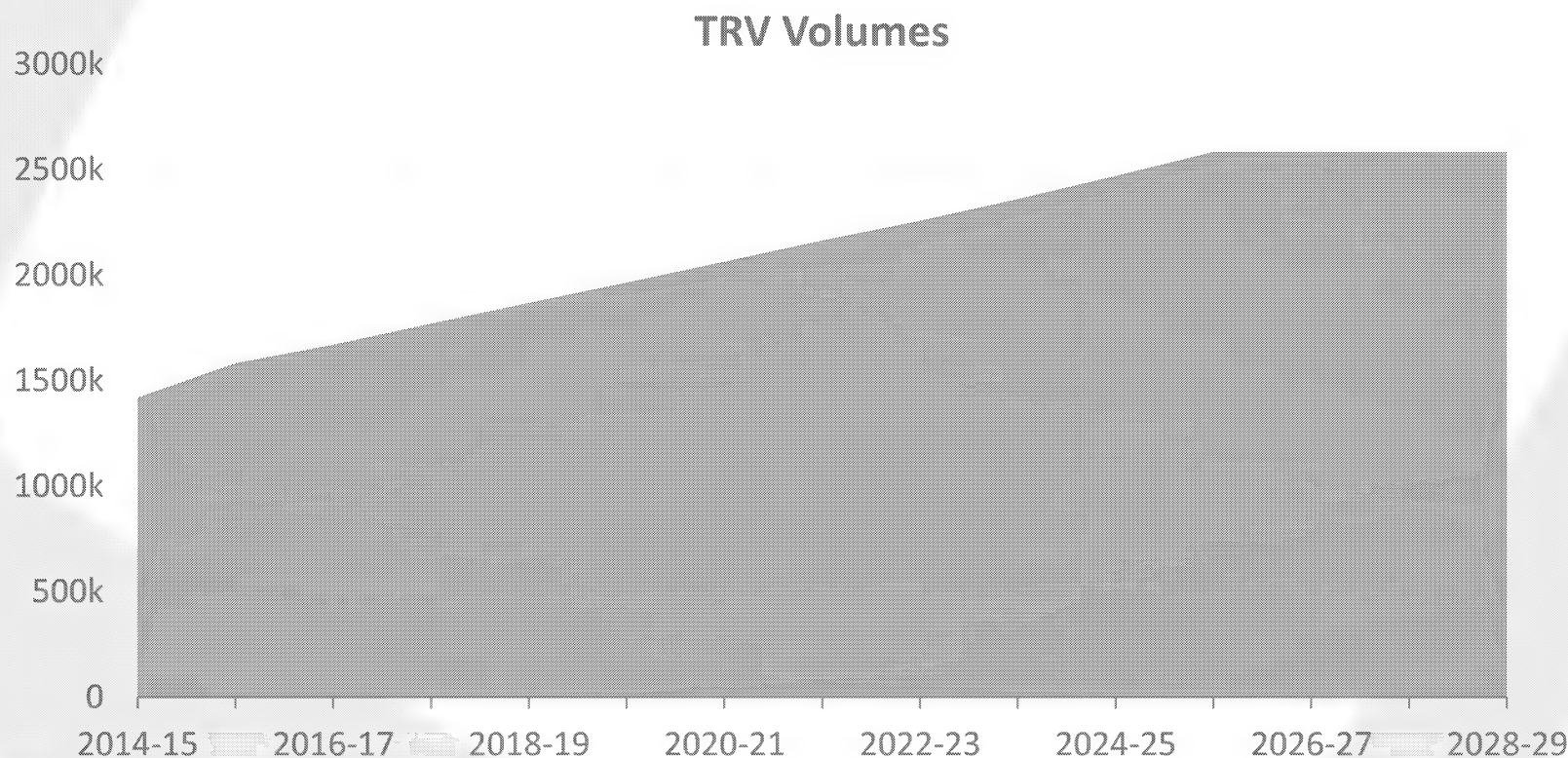


Overview

- This deck provides a quick outline of the business case for an investment in Advanced Analytics from the Innovation Fund.
- It is based on prudent assumptions to avoid inflated expectations.
 - In particular, the business case only estimates efficiencies to be made through automation of temporary resident visas (TRV), since the pilot provided a reasonable basis for estimating efficiencies.
 - This business case does not include any efficiencies that would result from other lines of business included in the investment proposal, namely:
 - Student permits
 - Streamlining of low-risk citizenship applications
 - Automation of passport renewals
 - Inclusion of these other lines of business would further strengthen the business case.

Assumptions for growth of TRV volumes

- Out of prudence, the deck assumes that the growth of TRV volumes will taper off to less than 5% annually after 2020-21 and that volumes will plateau starting in 2025-26.
- Faster growth would imply much greater potential efficiencies through advanced analytics.



Deriving efficiency gains

- Using their Time and Motion study, Finance estimated the average time required to process a TRV application from start to finish.
- From this, OPP subtracted the processing steps which would be automated by predictive analytics.
 - This represents the average time saved per application.
- These time savings were used to extrapolate the efficiency gains in terms of FTEs based on automating roughly one-third of TRVs globally.
- Out of prudence, this deck assumes that only half of those efficiencies would materialize.
 - This reflects, in part, the fact that a predictive model usually automates the simplest cases which are faster to process.
- The FTE efficiencies were converted to salary dollars using the average salary of all staff involved in processing TRVs, including support staff
 - The average salary used was about \$59K in 2016-17.
 - Since efficiency gains would mostly occur among higher-paid visa officers, this methodology includes some prudence.

Return on investment

- Under the base case, we anticipate negative cash flow during the three year period covered by the investment proposal.
- Cash flows would turn positive by 2020-21 and the initial investment could be recovered by 2023-24, only four years after the investment is completed.

Cumulative Discounted Cash Flows

s.21(1)(c)

s.23

Return on investment

- Considering the uncertainty around long-term projections, we present a range of possible outcomes for cumulative cash flows.
- Out of prudence, we have included more downside risk in the range.
- The bottom of the range would see the initial investment recovered by 2027-28, eight years after the investment is completed.

Cumulative Discounted Cash Flows (with Range)

Conclusions

- Even when focusing exclusively on TRVs, the project is expected to generate enough efficiencies to recoup the initial investment very quickly (four to eight years).
- Efficiencies can be reinvested to reduce processing times in other business lines, strengthen program integrity or focus on more complex cases.

Innovating: Deploying Advanced Analytics @ IRCC

HIGHLIGHTS

DESCRIPTION	✓ Use Advanced Analytics, as a <i>true innovative & transformative approach</i> , to automate risk triage & real time decision-making within business processes.																					
DEPARTMENTAL PRIORITIES	✓ Reduced processing times and Enhance client service																					
OUTCOMES	<div>✓ Shorter processing times as application volumes increase (24/7 capacity for computers; computers make faster decisions than humans).</div> <div>✓ Improved client experience</div> <div>✓ Enhanced consistency and quality in decision-making by minimizing the personal effect</div> <div>✓ Optimized resource allocation for processing (reassign officers to higher-risk cases; increased productivity and financial savings).</div> <div>✓ Strengthened program integrity</div>																					
KEY DELIVERABLES	<div>1. Deploy predictive models to support processing of TRVs and SPs for China and India, as a first step towards a global solution.<div>a. Predictive models will provide a daily analytics-based triage of all applications according to the level of risk.</div><div>b. Analytics-based triage will help identify cases for bulk approval without officer review.</div></div> <div>2. Deploy predictive models to support risk-triage for Citizenship and Passport applications, notably to detect fraud;</div> <div>3. Develop forecasting models to forecast three TR volumes (series): overseas applications for Visas (TRV), Student permits (SP), and Work permits (WP), as well as the volume of applications for Citizenship and Permanent Resident Cards (PRCs).</div> <div>4. Develop a Business Intelligence (BI) and Exploratory Environment (i.e. Advanced Analytics sandbox) to support the project.</div>																					
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Immigration, Refugees
and Citizenship Canada

Immigration, Réfugiés
et Citoyenneté Canada

Director General Steering Committee

Governance of artificial intelligence, advanced analytics and automation decision support initiatives

Intake

**Advanced Analytics for Privately Sponsored
Refugees**

International Network

March 9, 2022

Challenge

IRCC is aiming to process 316% more PSR admissions in 2022/23 than in 2021

- » The PSR Admissions target in 2022 and 2023 is over 30k, which is 10k higher than anticipated in the previous Multi Year Levels Plan. Additionally, there are 40K admissions needed for Afghanistan (some of which are PSRs). In 2021, there were approximately 9,500 PSR admissions. In order to meet these targets, tools are needed to contribute to processing efficiencies.

This has been highlighted as a clear priority for the Government and the Minister of IRCC

- » In the mandate letter, the Minister was charged with reducing processing times across many lines of business, and resettlement in general (and Afghans in particular) was highlighted as a priority.

Not relevant as per clarification agreement with requester

Project Overview

- » Privately Sponsored Refugee (PSR) applications are comprised of a two-step process; first the sponsor group is assessed for eligibility, and then the Principal applicant and their dependents are assessed for eligibility and admissibility at missions abroad.
- » International Network is proposing the creation of two Advanced Analytics models:
 - 1) A model that would **automate eligibility decisions** for certain low-risk sponsorship groups; Lower risk applications that meet legislative/regulatory criteria will be triaged for approval, but those which do not meet the criteria will go through normal processing and will not be adversely impacted.
 - 1) A model that would **triage principal applicants** based on eligibility complexity, to allow for better resource and target management facilitating more efficient application processing; all applications will still be reviewed by an officer for final decision, and applications that do not meet the criteria for “low eligibility complexity” will go through normal processing and will not be adversely impacted.

Projected results and benefits

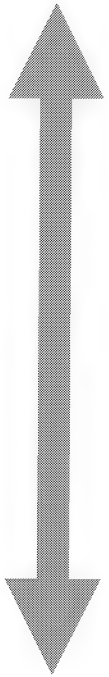
These models are expected to bring **processing efficiency, program integrity, and client service benefits.**

- » Allow the limited number of experienced refugee processing officers to focus their efforts on more complex cases, better organize the work so that administrative steps don't delay case processing.
- » Assist with moving towards an activity-based processing model where we can better use available network capacity to decrease regional disparities in processing times.
- » Help facilitate risk based processing strategies that make use of remote processing and interviewing tools.
- » Become more nimble to effectively deal with increased regular displacement events, for both staff and clients. Business as usual isn't feasible moving forward where rapid responses are increasingly necessary.
- » Triage existing inventories to streamline processing for cases that will be finalized this year and next.

Performance indicators could include **processing times and admissions.**

Mapping against other tools/models

Triage Only



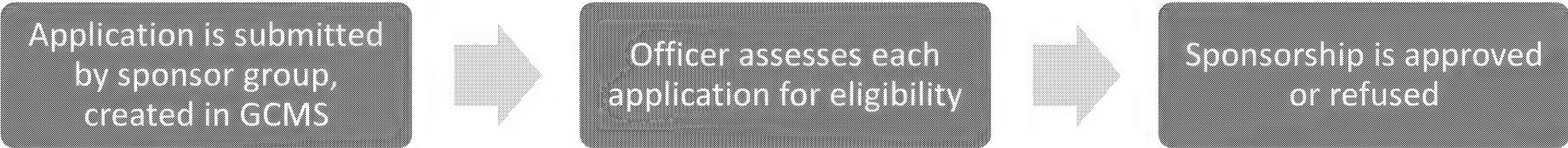
Decisions

- *Present relevant information to decision-makers (Overseas FC Automated Triage, PSR AA Principal Applicant Automated triage)*
- Alert decision-makers to unusual conditions (Lighthouse)
- Present information from other sources ('data matching')
- Provide assessments (e.g. scores, predictions, classifications)
- *Make positive sponsorship decisions (PSR AA Sponsor Eligibility Model)*
- Make positive principal applicant eligibility decision (TRV, FC Inland Models)
- Make the final decision

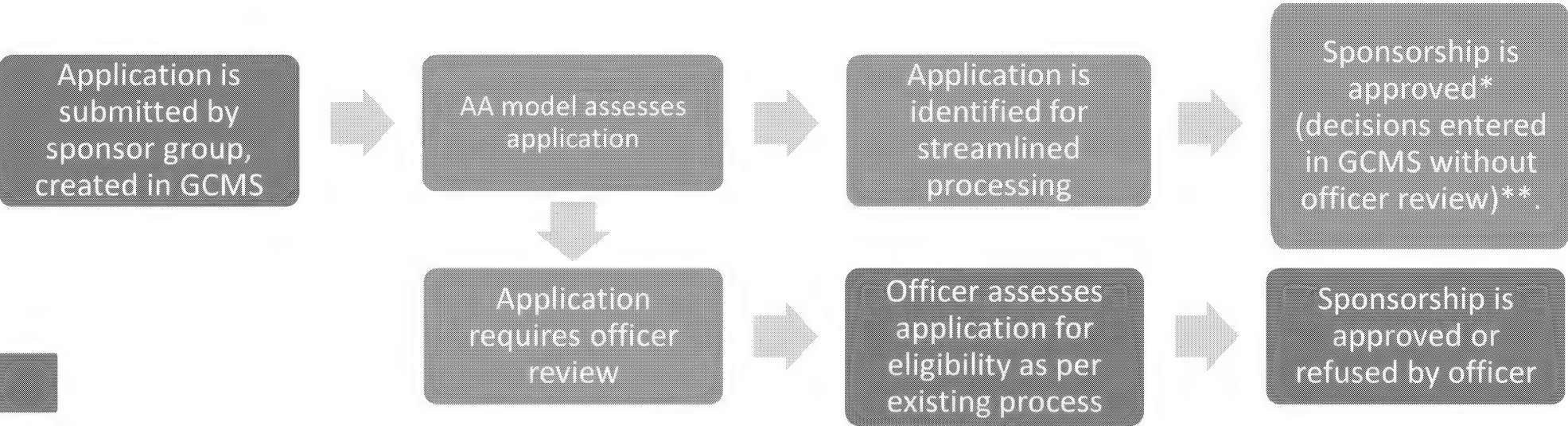
Before and after


Sponsor group eligibility model


Current State
(All applications reviewed by officer, high approval rate)



Future State
(Cases identified for streamlined processing are not reviewed by an officer)



Existing steps 

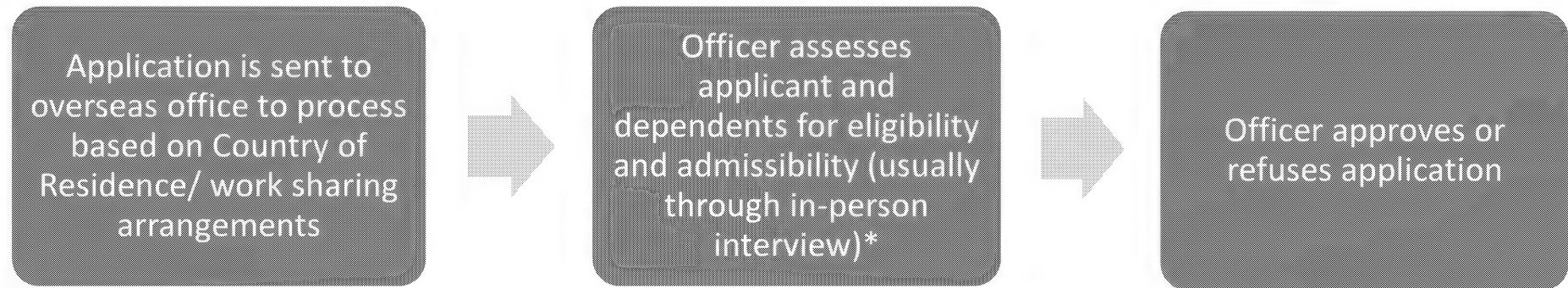
New model steps 

Before and after

Principal Applicant Automated Triage

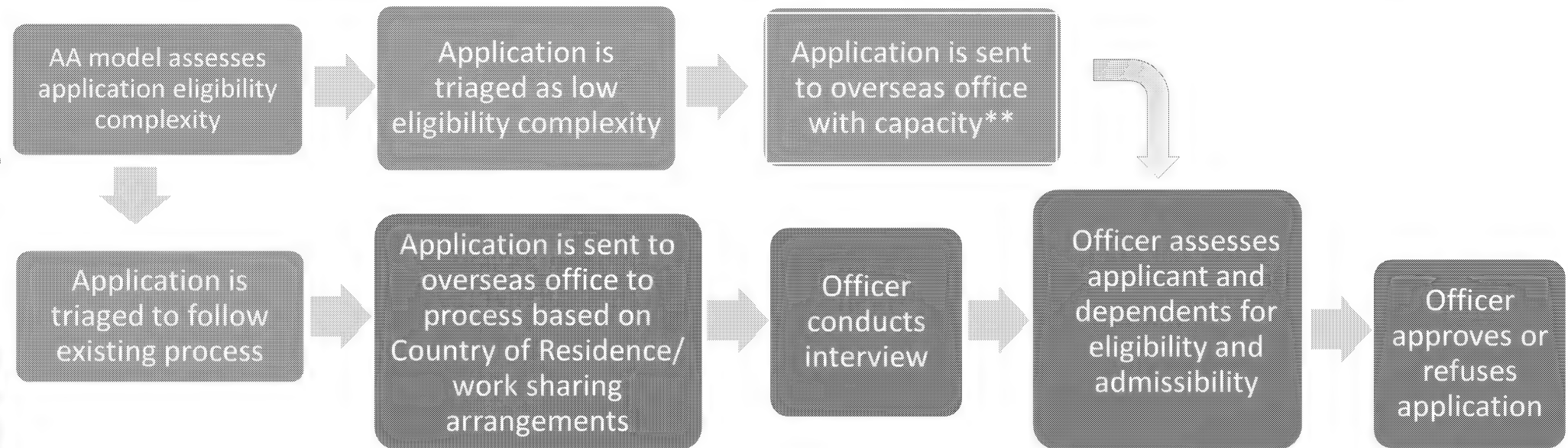
Current State

(All applications go into the same queue)



Future State (TBC)

(Applications are sorted based on eligibility complexity)



Existing steps

New model steps

Data foundation

- » The data sources includes Enterprise Data Warehouse (data from GCMS), and data stored on working spreadsheets that track sponsorship groups. The data is collected from the applicant, partners with whom we have MOUs/Arrangements, and processing officers.
- » Authority to use the data for this model will be assessed by Legal Services
- » Data quality will be assessed at the beginning of the project.
- » Open source geographic data may be used. For example, as per the current officer practice, the model may use the distance between the sponsorship group and the location where the applicant will settle to determine if they are sufficiently close to ensure the necessary physical and emotional support.

Privacy and Legal considerations

- » The introduction of AA into PSR could be interpreted as a major change to the program, and will likely trigger the need to conduct a PIA.
- » A notice would be required on IRCC's website to allow clients in the PSR inventory to be aware that their application may be processed with the assistance of AA.
- » Application forms would need to be updated to note the use of AA technologies in the privacy notice at the point of collection. PIBs and digital transparency pages will need to be updated as well.
- » The Office of the Privacy Commissioner would be engaged.
- »

Communication and public environment

- » IRCC's public messaging about automated systems has indicated that we do not use this technology for refugees.
- » Recent media coverage on other tools has conflated administrative tools with Artificial Intelligence and automation.
- » As a result, we recommend a transparent and robust communications and stakeholder consultation strategy to explain the shift, and the benefits to applicants.
 - » IRCC has not previously undertaken stakeholder consultations with the purpose of informing the development of a specific model.
 - » Efforts to find efficiencies in approval and processing, decrease regional disparities in processing times, and increase admissions of PSRs will be highlighted as clear benefits
 - » We will need to be prepared for questions about those who don't meet the "low complexity" criteria (including expected results)

Impact Analysis

- » This initiative falls within the scope of the *TBS Directive on Automated Decision-Making*, as the model for the sponsorship assessment will comprise a positive decision-making capacity. An **Algorithmic Impact Assessment** (AIA) will be needed. We anticipate, based on similar initiatives that have been completed, that it would result in an impact level 2.
- » A **GBA Plus** analysis will be completed
- » Rules used by the models will go through an extensive review process for **potential discriminatory impacts**.
- » A PIA will likely need to be conducted, however the level of impact (risk) is too early to determine until the assessment is underway and mitigation measures are identified.

Summary of actions and mitigation measures

Impact areas / Considerations

- TBS Directive (AIA impact level)
- Privacy
- Data (availability, quality, sharing)
- Legal considerations
- Preventing discrimination
- Communications (public scrutiny)
- GBA Plus
- Resources/cost

Actions / Mitigations / Requirements

- Complete AIA
- Complete PNA to determine whether PIA is needed, what mitigations are needed
- Complete MPA for the sponsor automated eligibility model
- Complete data assessment
- Complete legal analysis
- Complete Officer of Record Memo
- Extensive review of model rules
- Robust communications plan needed, as well as stakeholder engagement plan
- GBA+ analysis to be completed
-

Not relevant as per agreement with requester

Forward plan

Target date for launch

September 2022

Key milestones:

- » Develop model criteria
- » Test model
- » Complete supporting assessments (privacy, legal, GBA+)
- » Complete stakeholder consultations
- » Launch communications plan
- » Launch model

A²SC will develop a detailed work plan and will report regularly (similar to TRV model)

Return to DGSC for approval to launch

August 2022

Decision points

- ☐ Additional actions/mitigations/requirements identified (other assessments, higher approval level, additional DGSC check-in?)
- ☐ Approval to proceed



Immigration, Refugees
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Immigration, Réfugiés
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Director General Steering Committee

Governance of artificial intelligence, advanced analytics and automation decision support initiatives

Intake
Automated Triage for Visitor
Records

Centralized Network
July 14, 2022

Challenge

- » As Canada is a popular destination for tourism, IRCC continues receiving increasing volumes of Visitor Record applications since 2016. Applications for visitor records were at a peak in 2020, and are once again trending upwards.
- » Additionally events, such as the Ukraine crisis, has led to increased VR intake for applicants requiring extended lengths of stay in Canada.
- » In light of **increasing volumes, emerging crises** around the world, and the ongoing **impacts of the pandemic**, there is an evident need for improved tools and ways of processing.
- » Doing so will contribute to Departmental priorities, including Mandate Letter commitments to reduce processing times and allow resources to focus on more value-added tasks and specialized programs.
- » GCMS currently has automated eligibility and admissibility sub-activities for Visitor Records (VR), that cannot currently be used by CN as the functionality requires a Change Request. The Change Request has been noted for many years but has not been deemed an Ops priority. As such, an alternative solution is required for this line of business.

Project Overview

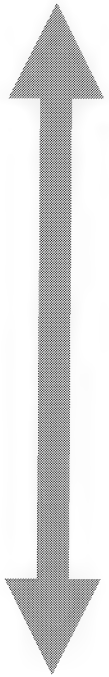
- » CN is proposing the creation of a model which will include automated triage and automated positive eligibility determinations.
- » The automated triage component will be based on rules developed by IRCC staff intended to:
 - » Leverage **case annotations*** that summarize application information from GCMS to reduce officer searches, and
 - » Enable better resource and target management by triaging applications based on complexity.
- » Criteria for the AA triage will be developed by IRCC staff, with consideration to AA patterns, stats, etc.
- » **Automated positive eligibility determinations are within scope**, with the goal of using a combination of business rules and rules generated by an advanced analytics (AA) algorithm to identify routine cases that do not require officer review of eligibility.

Projected results and benefits

- The triage processes are expected to bring benefits to **processing efficiency**
 - » **Streamlining the processing of simple applications** will allow decision-makers to focus efforts on more complex, time-consuming caseloads, which will in turn contribute to **faster processing times** for the overall Visitor Record caseload.
 - » Processing efficiency will also be gained through case annotations, by requiring **less time to scan for information in GCMS**.
 - » **Automated positive eligibility determinations** will eliminate the need for an eligibility assessment on part of the caseload.
- Key performance indicators may include **time and motion studies** to capture the average amount of time required to process an application, as well as **daily output** for decision-makers. Additionally an indicator would include quality and accuracy of the triage.
- Visitor Records are a high volume, low risk, and high approval rate caseload. Freeing up capacity on this caseload can potentially allow agents to be diverted to other Lines of Business at CPC-E like PGWP, WP-EXT, etc.
- The design can also feed into providing data for a future fully automated, end-to-end solution.

Mapping against other tools/models

Triage Only



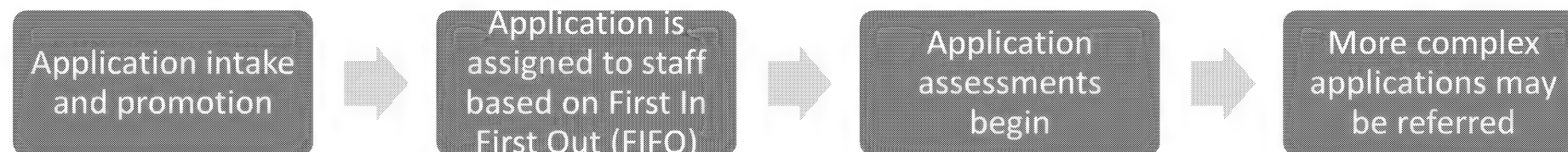
- ***Present relevant information to decision-makers***
- Alert decision-makers to unusual conditions
- Present information from other sources ('data matching')
- Provide assessments (e.g. scores, predictions, classifications)
- ***Make positive eligibility decisions (TRV, FC Inland Models)***
- Make the final decision

Decisions

Business Process: Before and after – Automated Triage

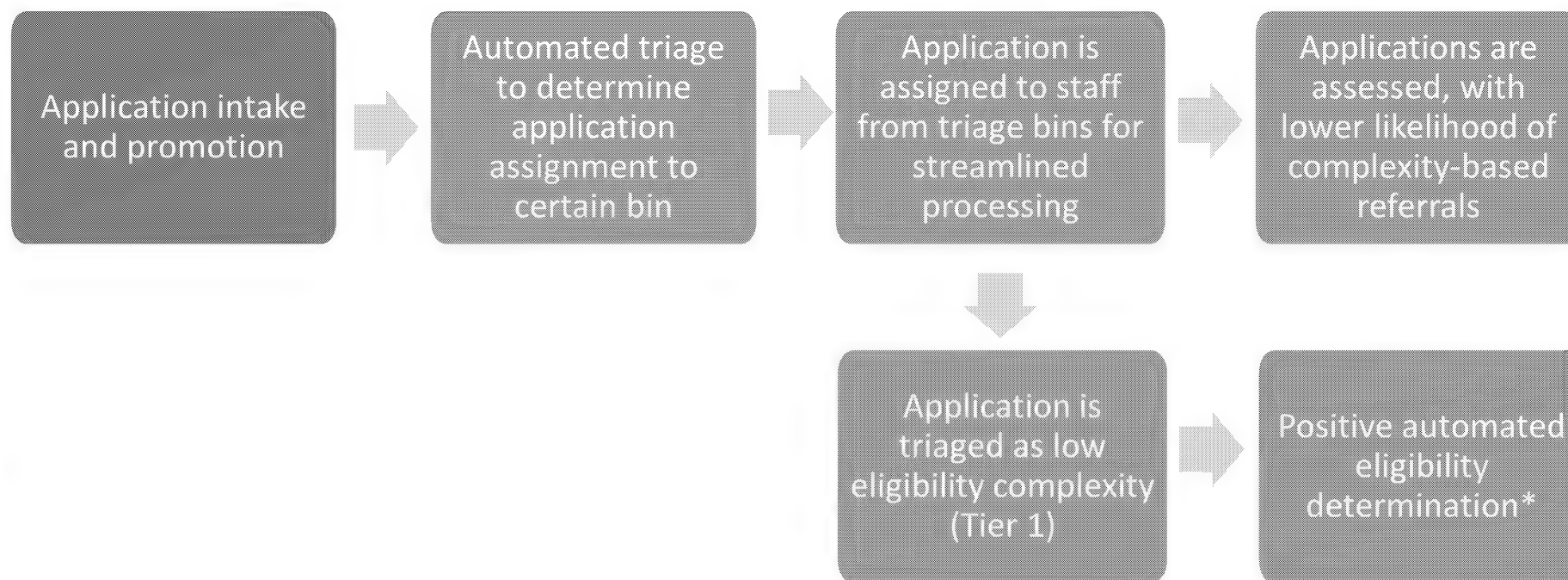
Current State:

Triage through manual review and complexity-based referrals



Future State:

Automated triage



Existing steps



New process steps





Data foundation

- » The primary data source is GCMS through the **Enterprise Data Warehouse**, in particular from past decisions made on Visitor Records.
- » Data is **collected directly from clients** as part of their applications, and the IRCC decisions relating to them.
- »
- » Data quality will be assessed at the beginning of the project, including an initial review for bias and discrimination. A GBA+ analysis will also be completed for a more detailed review.

Privacy and Legal considerations

- » The introduction of AA could be interpreted as a major change to the program. The project led by A2SC will consult with Privacy counterparts but it is possible that a **full Privacy Impact Assessment** will be required and led by Admissibility Branch.
- » **Personal Information Banks** and **communications regarding digital transparency** will need to be updated accordingly.
- » The Visitor Records application form will be required to be updated to contain a privacy notice regarding the use of Advanced Analytics in processing. PIBs and digital transparency pages will likely need to be updated as well.
 - » A notice will be required on IRCC's website to allow clients in the inventory to be aware that their application may be processed with the assistance of automated triage.
- »

Communication and public environment

- » Currently, there is **no automated triage in place for the Visitor Records caseload**. Communications products and digital transparency pages will be updated for transparency and clarity.
 - » Recent media attention has sometimes conflated administrative tools, Artificial Intelligence, and automation.
 - » Similar to existing communications on the use of Advanced Analytics and automated triage, any proactive or reactive messaging will continue to indicate that the **triage does not make or recommend refusals**.
- » A transparent and robust communications and stakeholder consultation strategy is recommended to explain the process and benefits to applicants.
 - » Efforts to find efficiencies in approval and processing and reduce processing times will be highlighted as clear benefits
 - » We will need to be prepared for questions about those who do not meet the “low complexity” criteria (including expected results)

Impact Analysis

- » This initiative falls within the scope of the *TBS Directive on Automated Decision-Making*, as the model for VRs will include automated positive eligibility determinations. An Algorithmic Impact Assessment (AIA) will be needed.
- » A GBA Plus analysis is required. A2SC is planning to monitor and will be actively analyzing for GBA+ anomalies in the Visitor Record stream as they are highly conscious of the need to apply a proactively ethical approach to the models. A GBA+ analysis will be completed by Admissibility.
- » Rules used by the triage will go through a GBA+ review process in order to identify **potential discriminatory impacts**.
- » A **Privacy Impact Assessment** may be required. Existing privacy protocol for workload triage tools will be used.

Summary of actions and mitigation measures

Impact areas / Considerations

- Privacy (notice to clients)
- Data (availability, quality, sharing)
- Legal considerations
- Preventing discrimination
- Communications (public scrutiny)

Actions / Mitigations / Requirements

- A2SC to leverage the Privacy Protocol for triage models to ensure privacy compliance
- Admissibility to complete Algorithmic Impact Assessment (AIA)
- A2SC to complete Privacy Needs Assessment to determine whether PIA is needed
- A2SC to complete data assessment
- Complete legal analysis
- CN to obtain DGSC approval prior to launch
- A2SC to complete Officer of Record Memo
- Admissibility to complete GBA+ Analysis
- A2SC and CN to complete extensive review of model rules
- COMMs to complete robust communications plan

Forward plan for automated triage

Target dates for launch for triage

Visitor Records

September 2022

Key milestones:

- » Develop model criteria
- » Test model
- » Complete supporting assessments (privacy, legal, GBA+, etc.)
- » Launch communications plan
- » Launch triage

A²SC will develop detailed workplans and will report regularly

Return to DGSC for approval to launch for Visitor Records

August 2022 (date TBC)

Decision points

- ❑ Additional actions/mitigations/requirements identified (other assessments, higher approval level, additional DGSC check-in?)
- ❑ Approval to proceed

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Business Requirements and Model Operations

Name of the model:

Spouse or Common-Law Partner in Canada (SCLPC) Advanced Analytics Pilot

A2SC Business intake #:

PR-FC-2021001

Prepared by:

Advanced Analytics Solutions Centre (A2SC)

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Document Change Control

Version#	Changed By	Date of Change	Description of Changes
1.0	A2SC	April, 2021	Initial Draft
1.1	A2SC	August 23, 2021	Changes to Model Rules and approved v1.1
1.2	A2SC	Sept 13, 2021	Changes to Model Input filters
1.2	A2SC	Dec 6, 2021	Changes to QA size
1.2	A2SC	April 11, 2022	Changes to Model Output for implementing blind QA
1.3	A2SC	May 30, 2022	Changes to Model Rules and implemented v1.2
1.3	A2SC	Jun 20, 2022	SADMs (Operations and Policy) Approval for the model transition from Pilot to Permanent
1.3	A2SC	April 25, 2023	Info about automatic GCMS Entry of triage results was added in p.8 &9.

Protected B

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General Information

Name of Initiative/ Model	Spouse or Common-Law Partner in Canada (SCLPC) Advanced Analytics Model
Description of Initiative	This pilot seeks to streamline the eligibility assessment for both the Sponsor and Principal Applicant of Spouse or Common-law Partner in Canada applications.
Service Requested by	Solutions and Task Team
Model Used by	Centralized Network
Model Launch Approved by Branch/Division who is responsible for the Model	Deputy Minister via memo IRM, IPG, and CN (in MPA)
Model Rules Approved by Type of Model	DG of CN via <i>Officer of Record</i> <input type="checkbox"/> Triage for workload sharing/distribution/classification <input checked="" type="checkbox"/> Triage for automated decision
Type of Rules	<input type="checkbox"/> Business rules suggested by users/SMEs <input type="checkbox"/> Rules generated by algorithm <input checked="" type="checkbox"/> Combination of business rules and algorithm
Model Capabilities (Can select multiple items)	<input type="checkbox"/> Image and object recognition <input type="checkbox"/> Text and speech analysis <input type="checkbox"/> Risk assessment <input type="checkbox"/> Content generation <input checked="" type="checkbox"/> Process optimization and workflow automation <input type="checkbox"/> Other (please specify)

Summary of Initiative

Background

The ambitious 2021 Immigration Levels Plan, coupled with the operational challenges posed by COVID-19, has created an imperative for the Department to innovate rapidly. The Department has committed to a range of 300,000 to 410,000 PR admissions with an overall target of 401,000 for the current year. This necessitates a significant ramp up in staffing, training and final decisions (FDs) over the course of the year. The number of FDs per month is expected to ramp up significantly from 26,000 in January to over 66,000 in September, according to the current operational plan. Without changes in how files are processed, significant challenges are anticipated in achieving these targets.

In response to these challenges, and to complement Departmental efforts to continue processing all family class applications, Departmental officials were tasked with developing and piloting an AA model under a very short time horizon, in order to support 2021 Levels. This pilot aims to increase the output of cases and facilitate eligibility decisions in the SCPLC. SCLPC applications are generally as evidenced by a historically low rate (i.e., 1 in 2019).

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The proposed AA pilot seeks to streamline the eligibility assessment for both the Sponsor and Principal Applicant of SCLPC applications. The duration of the pilot will be for a period of 6-9 months, targeting an April 2021 launch.

Objectives

The objectives of this pilot are to **support**:

- i. reduce existing backlog of Spouse or Common-Law Partner in Canada applications
- ii. optimize the process and automate specific workflows for making positive eligibility determination and reduce processing times for all SCLPC files
- iii. increase operational efficiency while maintain program integrity
- iv. understand the potential impacts (legal, privacy, etc.) on the PR family class programs, and develop and implement mitigations for these risks

Benefits

If the Pilot achieves these objectives, it will facilitate expedited processing the FC inland applications to assist IRCC to meet processing target, and confirm SCPLC's potential to increase operational efficiency while maintain program integrity, as well as to improve client experience. The Department plans to assess and leverage the experience gained in the development of this model to extend the use of AA into other business lines.

This is the first time that an AA model is deployed to expedite the processing of Permanent Resident (PR) applications, and as such, it represents a significant milestone.

Key Decisions

This section is to document the key decisions that are made for this initiative.

Date	Approved by	Key Decisions	Notes or links
March 25, 2021	Data Executive Steering Committee (DESC)	The committee agreed that the results of the AIA of the FC model meet the threshold of a level 2.	"DESC Meeting ROD - March 25 2021.docx": https://gcdocs2.ci.gc.ca/otcs/cs.exe/properties/394918735
April 1, 2021	Issues Management Committee (IMC)	Endorsement to move forward with pilot and proceed to ExCom	AA Spousal Inland - April 2021- IMC and EXCOM ROD (SECRET).docx https://gcdocs2.ci.gc.ca/otcs/cs.exe/link/415903972
April 7, 2021	Executive Committee (ExCom)	Members supportive of pilot implementation. Brief up to MINO and route outstanding AIAs that need to be published through governance.	AA Spousal Inland - April 2021- IMC and EXCOM ROD (SECRET).docx https://gcdocs2.ci.gc.ca/otcs/cs.exe/link/415903972

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Date	Approved by	Key Decisions	Notes or links
April 13, 2021	DG of CN	Approval of <i>Officer of Record</i> for SCLPC AA Model v1.0	1. Final Approval Memo to CN - Officer of Record https://gcdocs2.ci.gc.ca/otcs/cs.exe/link/396006493
April 15, 2021	Deputy Minister	Approval the Launch of the Model: F-1158911 - Measures to Facilitate SCLPC Processing	"e-approvals": https://gcdocs2.ci.gc.ca/otcs/cs.exe/properties/392633188
July 9, 2021	ADM Ops and ADM Policy	Approval of AIA and its release	"e-approvals": https://gcdocs2.ci.gc.ca/otcs/cs.exe/properties/403985228
August 23, 2021	DG of CN	Approval of Approval of <i>Officer of Record</i> for SCLPC AA Model v1.1	Approvals https://gcdocs2.ci.gc.ca/otcs/cs.exe/properties/413839822
April 14, 2022	DGSC	Endorsement to move forward from pilot to permanent.	"DGSC-ROD-2022-04-14.docx": https://gcdocs2.ci.gc.ca/otcs/cs.exe/properties/457149365
May 19, 2022	DG of CN	Approval of Approval of <i>Officer of Record</i> for SCLPC AA Model v1.2; implemented on May 30, 2022	"e-Approvals": https://gcdocs2.ci.gc.ca/otcs/cs.exe/properties/450160645
Jun 20, 2022	Senior ADM Ops and Policy	Approval the Transition of the Model: F-1224710 – from Pilot to Permanent	"SADM Approval Package F-1224710": https://gcdocs2.ci.gc.ca/otcs/cs.exe/properties/454779490

Model Changes

The model was approved by the Deputy Minister for launch. Any changes (i.e. adding, removing and modifying rules) to the model rules will be approved by the Director General of CN through the Officer of Record. If any risks that are identified to be addressed immediately, will follow the new AA Governance Process developed by A2SC and approved by DGs.

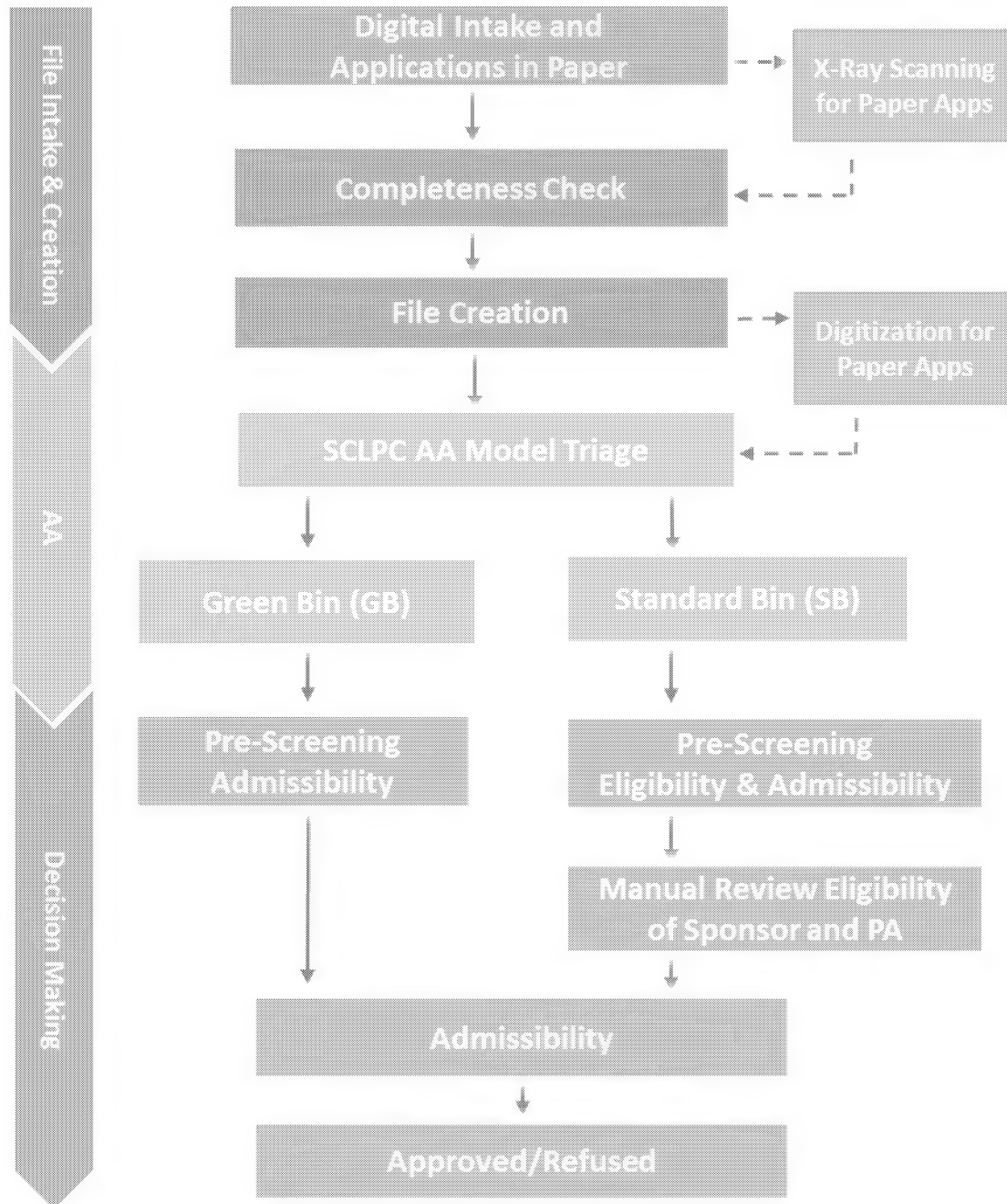
Model version	Approved by	Approved Date	Changes/Notes
SCLPC AA Model v1.0	DG of CN	April 13, 2021	R1-R7 Implemented on April 21, 2021
SCLPC AA Model v1.1	DG of CN	Aug 23, 2021	Added R8 and R9; implemented on Jun 4, 2021
SCLPC AA Model v1.2	DG of CN	May 19, 2022	Added R10, R11, R12; modified R2 implemented on May 30, 2022

Model Details

Business Workflow

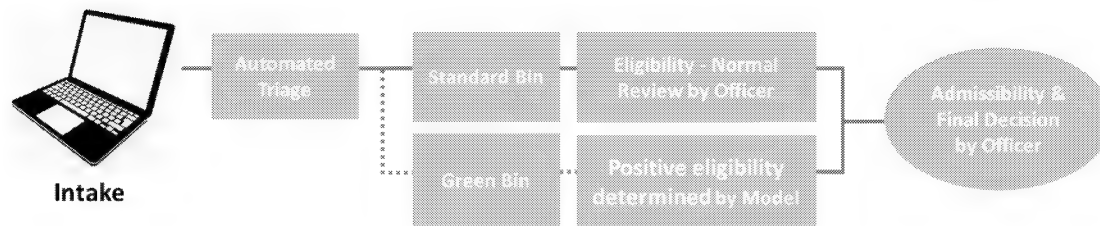
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The processing office will continue their regular intake functions, including carrying out a document completeness review, for both the principal applicant and sponsorship applications. The AA model will be run at a regular interval following the completeness check, creation and promotion of the application.



How the Model Works

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The model identifies low-complexity SCLPC applications, for which the eligibility of both the Sponsor and Principal Applicant (PA) would have a high likelihood of being approved in normal course of processing, and can therefore be triaged by the model and administratively passed. The model uses rule to place SCLPC files into either a “Green Bin” (GB) or a “Standard Bin” (SB) which results in the following actions:

Applications placed into the “Green Bin” will receive a positive eligibility determination of Sponsors and Principal Applicants based solely on the model’s assessment. The model will not assess eligibility for dependants in the GB, therefore, the eligibility of dependants to be processed by officers as they are currently processed. Admissibility assessments for applications placed into the “Green Bin” will be completed by officers, as per standard procedures.

Applications placed into the “Standard Bin” will have both the eligibility and admissibility of Sponsor and Principal Applicants assessed by officers, as per standard procedures. While these applications are considered to be more complex, given the overall high approval rates for this line of business, applications in the “Standard Bin” are still highly likely to be approved.

The model does not make any form of negative recommendation on an application, and that no applications will be refused by the model.

Use of the Model

Who will use the model?

The staff at the centralized network (CPC-Mississauga) will use the model output for processing.

For files that are in GB, a positive eligibility decision for the sponsor and the principal applicant is made by the model. Even if in GCMS it appears that the employee made the decision, the accountability and responsibility rest with the Director General, who signed the Officer of Record memo. Following those GCMS steps, the file will move forward for standard processing.

For files that are in SB will be processed by officers as usual.

All applications will still require assessment, as per standard procedures for eligibility of dependants, and all elements of admissibility, including criminality, security, and medical, for the Principal Applicant and dependants.

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Clear program delivery instructions (PDIs) for officers have been published on connexion to provide instructions on how to use the model as well as to mitigate risks around fettering officer decisions. Officers are instructed not to review “Green Bin” applications for eligibility, since this determination is made using the AA model, however they retain the discretion to re-evaluate the eligibility determination of a “Green Bin” application, as necessary.

GCMS entry

Started on April 28¹, 2023, GCMS automatically (according to CR# 838409²) assigns GCMS Org ID based on the triage results provided by the Advanced Analytics Solutions Centre (A2SC).

Bin	Org Name	Org ID	Notes
Green			
Green + Dep			
Standard			
Green QA			The QA ID was used from the launch of the pilot on April 21, 2021 and stopped on April 11, 2022, requested by IRM and CN to implement a blind QA system.

Business rules for GCMS Automatic data entry:

System must automatically assign the ORG ID based on its corresponding number only when the following conditions are met:

- Categories must be FC1 or FCC
- Sponsorship Eligibility Assessment field is equal to ‘Not Started’

Category	Eligibility Activity Type
FC1	Eligibility - FC Sponsorship
FCC	Eligibility - FC Sponsorship

- PA Eligibility Assessment field is “null”

Category	Eligibility Activity Type
FC1	Eligibility
FCC	Eligibility

- Application Status field is ‘Open’
- Final Decision is blank

If any applications cannot be automatically entered due any unexpected reasons, A2SC will provide a list of these applications with CN for manual data entry. Regular weekly reports will still be provided with CN for a required timeframe for QA purpose.

CN will receive a notification from A2SC after the automation is completed every week.

¹ Prior to April 28, 2023, CN (CPC-M) associate different organization IDs with applications that have been triaged by the system for tracking based on the triage results.

² "Detailed Requirements for CR #838409 – Automatically assign bin numbers and User ID based on advanced analytics triage.docx": <https://gcdocs2.ci.gc.ca/otcs/cs.exe/properties/479735225>

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s.16(1)(c)

How the model is developed

How the rules were developed

The model was initially developed based on a set of evidence-based, data-driven rules. These rules reflect factors that correlate with approvals. The rules were then further interpreted and validated by subject matter experts, in order to ensure that the appropriate justifications are documented and to address possible concerns about bias, including removing rules that were controversial.

The proposed model was tested on a data set of 40,343 inland spousal applications that were processed in 2018 and 2019. When tested, the model predicted that roughly 59.3% of the caseloads would be classified as “Green Bin” and the remainder were classified as “Standard Bin”. The predictive accuracy of this test was 99.3%, meaning that only 0.7% of applications that were predicted to be positively triaged by the model, did not result in a positive eligibility determination.

See details of the approved model rules in annex A.

Constraints

. This has been communicated with senior management and stakeholders and documented in various documents such as memo, risk register and risk mitigation, etc.

Internal Peer Review

During the development of the model, multiple data scientists reviewed the modelling to ensure the methodology is sound and logical and it is designed to achieve the expected outcome.

Data quality and Bias

When designing the model, data scientists reviewed the key data elements that are relevant to the program, such as marital status, age and client history, etc. and made efforts to identify any data discrepancies and quality issues and how it affected modeling. There were no major concerns, some minor problems were discovered but fixed (some of them are not used for the model). This was documented in A2SC's issue log, which is part of A2SC's normal process.

An analysis of the characteristics of the overall population of the training data was also performed including gender, age, sexual orientation.

Privacy and security

The team consulted the privacy and IT security experts at IRCC at the design stage to ensure any of the privacy and security principles were considered in the design stage and protocols were followed, no concerns were identified.

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Operations of the Model

Model Input

Updated on Nov 10, 2022 requested by CN-CPCM

Parameters	Notes
Application Primary Office is equal to / is in CPC Mississauga and Application Category is equal to / is in FC1; FCC and Application Subcategory is equal to / is in CDA; PP and Sponsorship Eligibility Assessment is equal to / is in Not Started and (PA) Eligibility Assessment is null and Application Status is Open and Application Assigned To is equal to / is in Unspecified and Org ID is not To is NOT in O149069334341, or O261799254484 or O140635752433, or O261799254569 and Org Disassociation is blank	<p>The model runs after completeness check, creation and promotion of an application. *CN only transfers digitized GB files IN O149069334341 – Incomplete apps O261799254484 – Incomplete apps O140635752433 – Incomplete apps O261799254569 – Incomplete apps</p> <p>means: file is rejected due to incomplete application is submitted, which is identified at the file creation stage prior model triage.</p> <p>Add the following two Org ID only to the output report. Org ID O268073013482 - Returned from digitization means: files are returned from 3rd party and completed digitization, docs are uploaded (CN transfers these cases to IN)</p> <p>Org ID O269754626955 -Not digitized means: files are neither digitized nor uploaded, these files are usually paper applications and will remain with CN for processing)</p>

Updated on Sept 20, 2021 requested by CN

Parameters	Notes
Application Primary Office is equal to / is in CPC Mississauga and Application Category is equal to / is in FC1; FCC and Application Subcategory is equal to / is in CDA; PP and Sponsorship Eligibility Assessment is equal to / is in Not Started and (PA) Eligibility Assessment is null and Application Status is Open and Application Assigned To is equal to / is in Unspecified	<p>The model runs after completeness check, creation and promotion of an application.</p> <p>*CN only transfers digitized GB files IN</p> <p>Add the following two Org ID only to the output report.</p> <p>Org ID O268073013482 - Returned from digitization means: files are returned from 3rd party and completed digitization, docs are uploaded (CN transfers these cases to IN)</p> <p>Org ID O269754626955 -Not digitized means: files are neither digitized nor uploaded, these files are usually paper applications and will remain with CN for processing)</p>

Original input implemented on April 21, 2021 requested by CN

Parameters	Notes
Application Primary Office is equal to / is in CPC Mississauga and Application Category is equal to / is in FC1; FCC and	The model runs after completeness check, creation and promotion of an application.

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Application Subcategory is equal to / is in CDA; PP
 and
 Sponsorship Eligibility Assessment is equal to / is in Not Started
 and
 (PA) Eligibility Assessment is null
 and
 Application Status is Open
 and
 Application Assigned To is equal to / is in Unspecified
 and
 Paper File Location is equal to / is in Registry; Inland - ready for decision maker; Inland Review- Pre-Screened Pending; Inland Pending Review; Inland Inventory; SCLPC - Digitized; Digitized Inland Review - Pre-Screened Pending; Digitized - Inland - ready for decision maker

*CN only transfers digitized GB files IN

Model Output (In Excel)

Updated on April 11, 2022 requested by IRM and CN for implementing blind QA

SCLPC AA Report (Protected B)														
App #	PA UCI	PA HH UCI	SPR UCI	SPR HH UCI	App Lock-In Date	PA Corr Language	SPR Corr Language	Dest Prvnc	Has org ID 0268073013482	Has org ID 0269754626955	Paper file Primary Location	Bin CN	Scored On Date	Bin (hidden in output report for IRM QA)
						English		Alberta	Y	N	SCLPC - Digitized	GB	yyyy-mm-dd	GB
						French		Ontario	N	Y	Registry	SB	yyyy-mm-dd	SB
												SB		GB-QA
												GB-Dep		GB-Dep

Original output implemented on April 21, 2021 requested by CN

SCLPC AA Report (Protected B)														
App #	PA UCI	PA household UCI	SPR UCI	SPR household UCI	App Lock-In Date	PA Corr Language	SPR Corr Language	Dest Prvnc	Has org ID 0268073013482	Has org ID 0269754626955	Paper file Primary Location	Bin	Scored On Date	
F00XXXX	XXXXXX	XXX	XXX	XXX	yyyy-mm-dd	English	xxxx	Alberta	Y	N	SCLPC - Digitized	Green	yyyy-mm-dd	
F00XXXX	XXXXXX	XXX	XXX	XXX	yyyy-mm-dd	French	xxxx	Ontario	N	Y	Registry	Standard	yyyy-mm-dd	

Frequency (and Volumes)

The 1st report was produced on April 21 to launch the model, with approx. 5200 triaged applications.

Weekly reports started with the 2nd run on May 10, 2021 with 347 triaged applications. It was estimated that the model will triage approx. 500-600 applications each week.

Distribution

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The weekly reports (GCDOCS links) are distributed from A2SC's general mailbox IRCC.OPPA2SC.REPORTS-RAPPORTS.CSA2PRO.IRCC@cic.gc.ca to the distribution list

Recipients of the reports (requested by business): individuals at CN-NHQ, CPC-M, IRM and IPG

A reminder of proper use of the model (PDI link) and privacy and safeguard is also included in the email.

Retention and Disposal

	Location	Retention Period	Notes
Model Code	Source control (managed by IRCC) and Data Scientist's Work Station	indefinitely	The current model in production is retained indefinitely. When the model is updated (retrained, new rules, any other modification that would affect it in production), then the previous version is retained for 10 years.
Model Output – Officer report	Cloud	10 years	Reports for Officers: Saved in the Protected B cloud and automatically deleted after 10 years (moved to cloud due to space issues in GCDOCS). The copy of the report in GCDOCS will be deleted after 6 months. The retention needs will be reassessed during the pilot
	GCDOCS	2 years	
Model Output – Legal report	Cloud	10 years	
	GCDOCS	2 years	

Quality Assurance

1) QA by IRM

In order to reduce program integrity risks, the Department (IRM branch) has enacted a continuous, targeted QA program based on a random sampling of "Green Bin" applications. Officers at CN (CPC-M) will manually assess the eligibility of the sponsor and principal applicant in the QA sample. The results of the QA exercise are captured in the PI tool and QA reports (by IRM) will be used to monitor and improve model performance.

- **QA Size**

As agreed with the stakeholders, A2SC will confirm the QA number requested by IRM each week for the first few runs until a fixed QA number can be confirmed for each run.

In November 2021, IRM requested A2SC to update the QA sample size from a numeric 10 to a sliding scale of 2.43% of the GB by using conventional rounding rules (i.e. .1 to .4 = round down, .5 to .9 = round up) for each run. This will continue going forward until requested otherwise. **The requested QA change were implemented on December 6, 2021.**

- **Blind QA**

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In April 2022, IRM and CN updated the QA plan, as a result, a blind QA system was implemented on April 11, 2022.

Requirements details from IRM and CN

- “Green – QA” files are to be re-triaged to the Standard Bin. As such, they will not appear as QA files, nor will they be distinguishable from Standard Bin files, in CN’s records or in GCMS. **CPC-M will no longer be aware of which files are QA.**
- .

Processing officers will no longer be able to determine whether a given file is QA.

- Though re-triaged to the Standard Bin, QA files will continue to be coded by OPP in a way that they will still be identifiable to IRM on the weekly output report. **IRM’s analysis of QA files will continue as-is.**

Impact of the Blind QA

1) there won’t be any new entries of QA cases displaying in GCMS after the implementation.

Therefore, reporting of QA cases in GCMS Answers won’t be available.

2) A2SC can provide App numbers of QA cases; IRM also tracks QA cases from A2SC’s weekly report.

3) If any parties want to track QA cases in GCMS Answers, the old QA org ID can be added in GCMS anytime (i.e. after the eligibility decision or final decision is made). However, it is not A2SC’s decision and A2SC is not able perform this task.

2) Frontline feedback and monitoring on GB

In order to capture feedback from the frontline officers and ensure any issues are timely flagged for monitoring and model performance improvement, CPC-M officers are instructed to tag an organization ID . to the GB cases that may have eligibility concerns at the admissibility assessment stage in late August, 2021. These applications were flagged does not mean the model triaged them unsuccessfully because an applicant could be eligible at the time of triage but new info is added after triage and model is not able to detect, etc. The eligibility decision on these applications could still result in a pass.

Reporting

Report	Details	By	Notes
Weekly model output table (for operational volume management)	GB size and SB size and Volume, completion of eligibility and FinDec.	A2SC	Weekly progress reports were shared with networks.
GBA + report (for unintended bias)	GB, SB, client’s gender, age, etc, potential impact of the model rules.	A2SC	An initial report was produced by ST and A2SC, and reviewed by GBA+ team, SPP, IB. A follow up report was conducted in Mar 2022.
QA report (for program integrity)		IRM	An initial report was produced in June 2021. Weekly report started in Feb, 2022

Stakeholders and Key Activities

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Branch	Key Activities/Products	Contact
OPP (A2SC)	Model development and delivery, technical documentation, and weekly model triage. Work with key stakeholders to develop business requirements, and monitor model performance. Coordinated completion of AIA	Jae-Jin Ryu Taylor Williams Na Guan David Son Joseph Bogaard
Solutions Team	Draft DM memo for approval of model rules and deployment; provide design input and develop model rules with A2SC; initiative coordination and develop and maintain mitigations.	Paul Jamieson Candace Mantha
IRM	Identify model risks, develop QA plan and monitoring indicators, risk registry. Monitor QA results and provide feedback with A2SC for model improvement.	Sara Collins Ryan Kaiser Parveen Sandhu
CN	Provide design input parameters, and output; review and use weekly model triage output, provide feedback with A2SC on the use of the model. Perform QA exercise, provide feedback with A2SC for model improvement.	Elsbeth Dowhan Elise Pineau Chrissy Haley Jessica Thomas Nicole Mason
IPG	Develop PDI and instructions for operations. Update application forms. Conduct Privacy Impact assessment with ATIP	Julie Antiporda Alexandra NgYong Isabelle Corbin
SPP	Provide governance secretariat function, i.e. DESC. Review and provide input/comments on GBA+ analysis, AIA, etc.	Gregg Blakely Benoit Richer
LSU	Review and comment on model risks and proposed mitigations. Provide legal Opinions.	Anna Lillicrap Marta Lamosova
ATIP	Review and comment on model risks and proposed mitigations. Conduct PNA and MPA.	Brianne Matheson
COMMS	Provide support on internal and external communications when applicable. Transparency page, notice for clients, comms implications in briefing materials.	Heather Elgee Natalie Pierce
Project Management	Initiative tracker	Laura Thompson
IB GBA+	Patriciate GBA+ workgroup meetings, provide input in conducting GBA analysis and monitoring plan.	Sonja McKay (IB) Yvonne McKinnon (GBA+)

Governance Check List

Protected B

The following items have been identified by stakeholders and completed for governance purpose.

		Documents	Notes	Link
Accountability	Approval	<input checked="" type="checkbox"/> MEMO for Approval of the model <input checked="" type="checkbox"/> Officer of Record	DM Memo and Appendix - Appendix A Rule justification - Appendix B TBS requirement - Appendix C Risk and Mitigation Registry	DM memo package Officer of Record
	Risk Management	<input checked="" type="checkbox"/> Risk Register		Risk registry
Fairness	Legal	<input checked="" type="checkbox"/> Legal Opinion		Legal Opinion
Explainability	GBA+	<input checked="" type="checkbox"/> GBA+ Initial and Follow up		GBA+ analysis
	Training	<input checked="" type="checkbox"/> Program Delivery Instructions		PDI
Privacy	Assessment	<input checked="" type="checkbox"/> Rule Justification		Rule justification
		<input checked="" type="checkbox"/> Privacy Needs Assessment <input type="checkbox"/> Privacy Impact Assessment <input checked="" type="checkbox"/> Model Privacy Assessment		PNA MPA
	Notice	<input checked="" type="checkbox"/> A web or other notice for historical clients <input checked="" type="checkbox"/> A web notice “ <i>After You Apply</i> ” for inventory clients <input checked="" type="checkbox"/> Privacy notice on Application Forms for future clients	-Historical Applicants: Whose data was used to develop the model -Inventory/Current Applicants: Who have applied and will be triaged by the model - Future Applicants: be notified at the time of collection according to s 5.2 of the Privacy Act	Notice for historical clients A web notice “ for inventory clients Notice on Application Forms was added in the summer 2022 FORM IMM1344
Security	Security	<input type="checkbox"/> Security authorization	The model runs in an environment which is pre-authorized by IT security.	
Transparency		<input checked="" type="checkbox"/> Transparency Page		Transparency Page
		<input checked="" type="checkbox"/> Algorithm Impact Assessment <input checked="" type="checkbox"/> Peer Review		AIA package Peer review
Model Performance	Quality Assurance	<input checked="" type="checkbox"/> Quality Assurance Plan		QA Plan April 2022 QA plan
Other		Monitoring Plan for the use of the model Initiative tracker		Monitoring the use Initiative tracker

**Pages 70 to / à 73
are withheld pursuant to sections
sont retenues en vertu des articles**

16(1)(c), 16(1)(b)

**of the Access to Information Act
de la Loi sur l'accès à l'information**



Immigration, Refugees
and Citizenship Canada

Immigration, Réfugiés
et Citoyenneté Canada

Director General Steering Committee

Governance of artificial intelligence, advanced analytics and automation
decision support initiatives

INTAKE

Lighthouse

Steady State to Temporary Resident Programs

Integrity Risk Management Branch

July 14, 2022

Challenge

- » As high-risk clients and unscrupulous agents become more sophisticated, traditional risk assessment tools find it more difficult to detect them. **Lighthouse is an AI-based risk indicator solution that automatically and comprehensively extracts risk and fraud patterns from source data for any applicable line of business.** It can also be described as a customizable data mining tool that identifies and presents fact-based information.
- » **Scope:** Temporary Resident Programs – Student, Worker, eTA, and Visitor
- » **Proposed functionality of model/solution:** Risk analysis and scoring
- » **Priority:** To support the reduction of the TRV backlog inventory
- » **Alignment to departmental/government objectives:** Budget 2022 - Priority processing
- » IRM is currently resourced with two FTEs who can provide future support to the Operations Sector in identifying micro and macro patterns and work with the Integrated Network to improve processing efficiencies.

Project Overview

The objective of Lighthouse is to improve program integrity outcomes in visa application processing.



IRCC has enormous data holdings but struggles to turn this into real-time risk intelligence for decision-makers. To address this challenge, IRCC developed a new data mining tool, Lighthouse that leverages advanced analytics techniques to identify applications that may be high-risk.



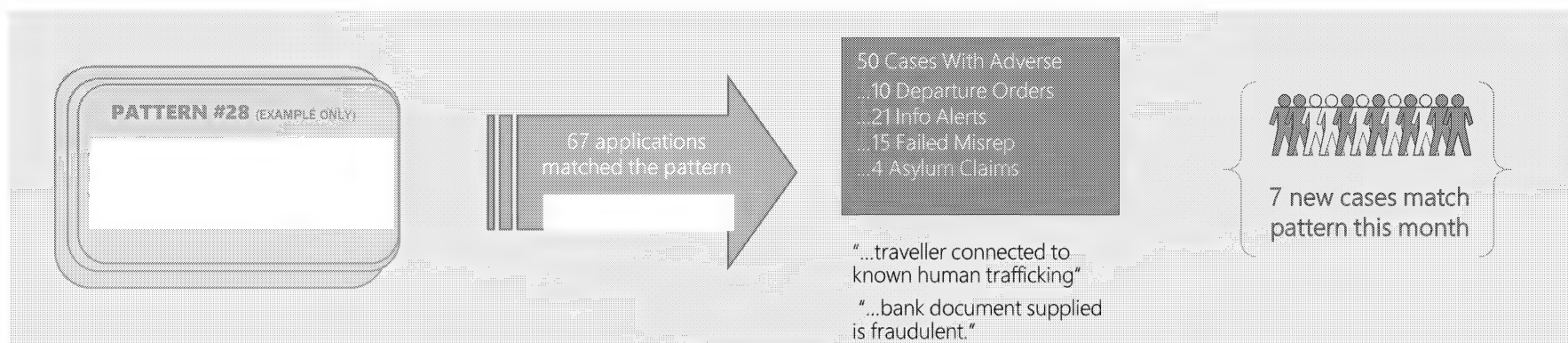
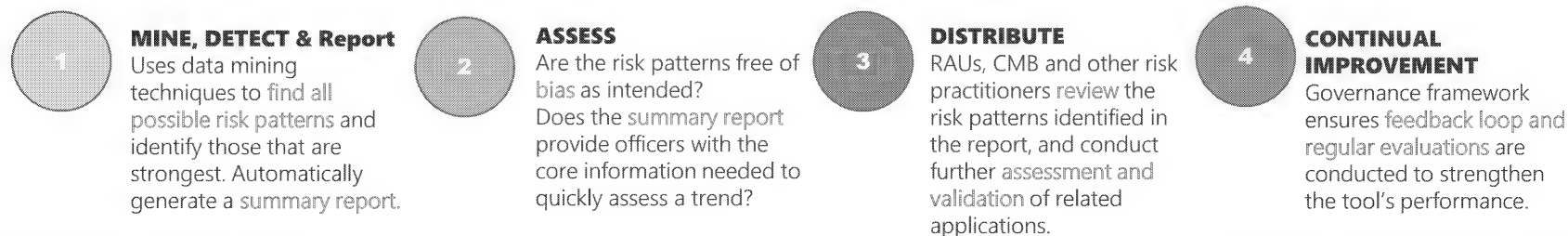
Lighthouse dovetails with existing intelligence-based risk detection approaches and can comprehensively analyze **large volumes of data and identify patterns that may point to high-risk clients** with adverse characteristics, such as criminal activity and misrepresentation.



IRCC staff are then able to **operationalize the intelligence** uncovered by this tool to support decision-makers.

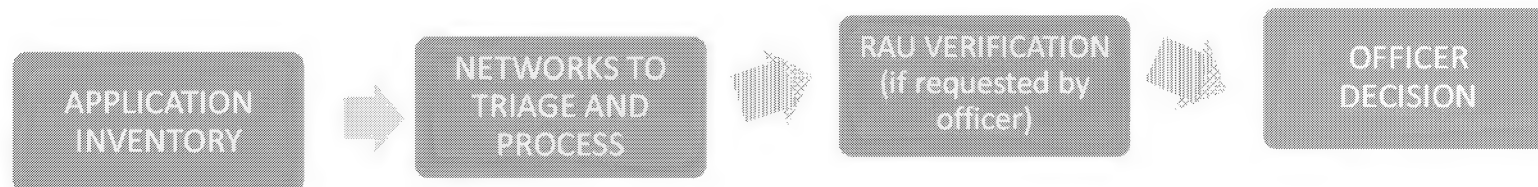
How Lighthouse Works

Within global caseloads, Lighthouse automatically and systematically identifies pockets of connected applications with a high incidence of adverse events

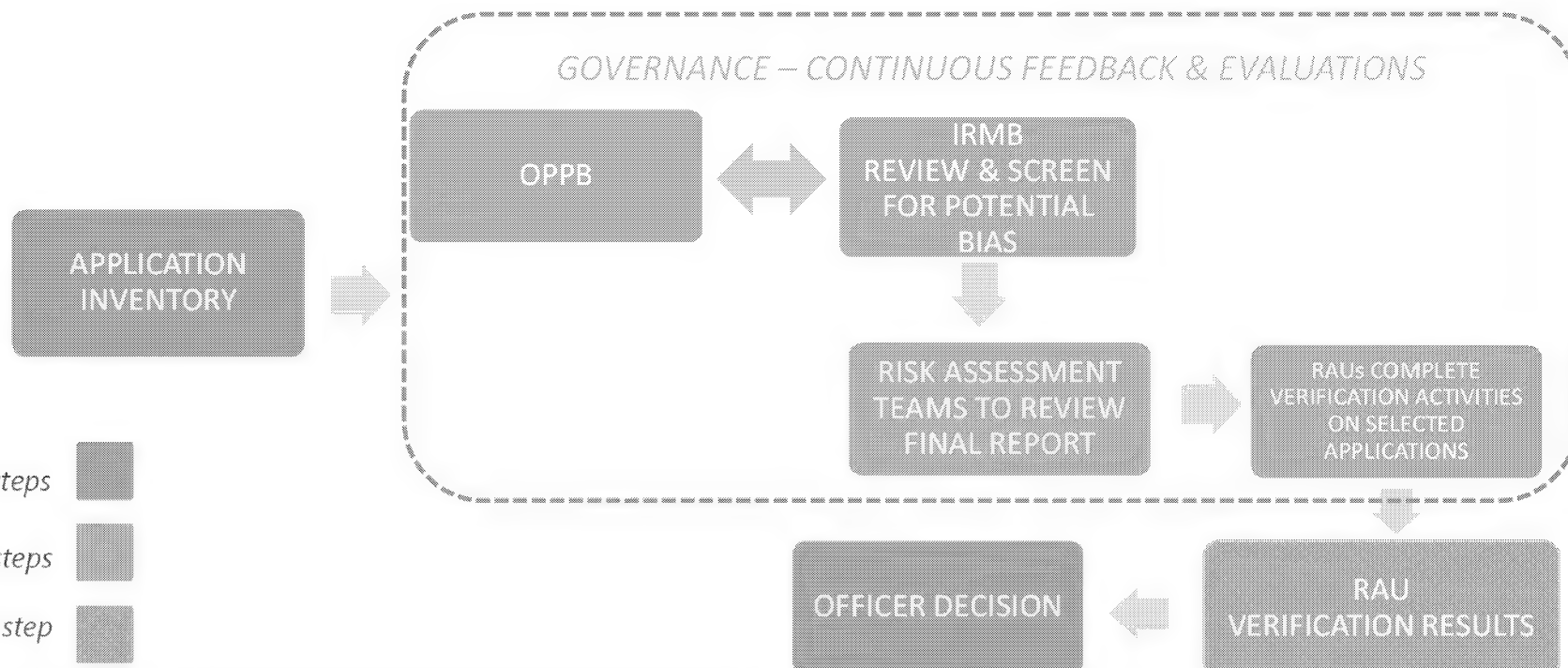


Process: Before and After

Current State



Future State



Existing steps



New model steps



Changed step



Piloting Lighthouse – International Student Program (ISP)

Manual Verifications (not involving Lighthouse)

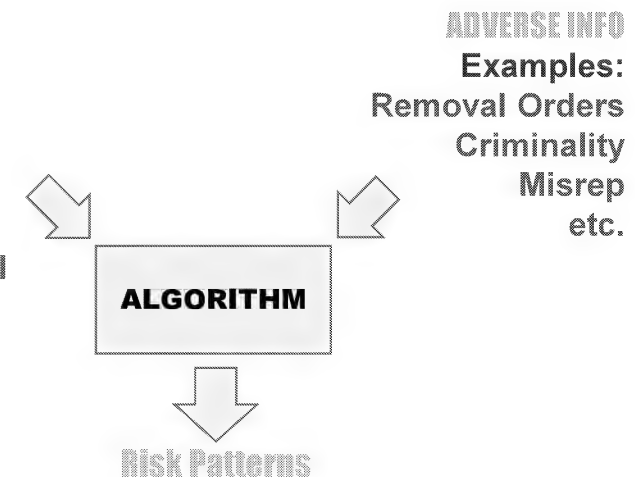
- About 9% adverse rate for applications selected for verifications without using Lighthouse.
- These verification referrals rely on officer experience and judgement, or are selected as part of a Targeted Integrity Exercise (TIE).

Study Permit Pilot #1 (July to September 2020)

- About **18% adverse rate** for applications selected for verifications using Lighthouse had at least one adverse finding (e.g. fraud), and contributed to the discovery of previously unknown fraud trends.

Study Permit Pilot #2 (September to December 2021)

- About **33% adverse rate** for application selected for verifications using Lighthouse had at least one adverse finding (e.g. fraud), which is considerably higher than without Lighthouse.



Projected Results and Benefits

» Benefits:



Risk Assessment Teams – Proactively identifies potentially high-risk clients with strong links to adverse outcomes to enable risk assessment team to investigate.



Flexible and Customizable for Operations – System can scan for almost all forms of data-detectable risk patterns, and be configured for specific risk types (e.g., misrep, organized crime, etc.) or countries.



AASC and its clients – Lighthouse is built in-house and is readily adaptable to other IRCC business lines. The output can be used as additional input to enhance the performance of existing and future AA models.

- » **Strong consensus from risk assessment officers** that implementing Lighthouse on a permanent basis would allow officers to process applications more effectively by enhancing IRCC's fraud detection performance.
- » Risk indicators would be measured/tracked to **help improve/support decision making**.

Data foundation

- » **Source of data:** IRCC Enterprise Data Warehouse that is accessed by OPPB.
- »
- » **Authority to use the data:** IRCC already has the required authorities in accordance with the Migration Control and Security Management personal information bank, PPU068, as described under “consistent uses” that include the detection, suppression, and prevention of immigration offences, for quality assurance purposes, and to determine an individual’s admissibility. IRCC may also use this personal information with computer analytics to support research, statistics, program and policy evaluation, internal audit, compliance, risk management, strategy development, and reporting.
- » **Open source data:** Not applicable.
- »

Privacy and Legal considerations

Privacy

- » The Model Privacy Assessment (MPA) that was initiated for the Study Permit Pilot #2 had identified the following gaps:
 - » **Retention and disposition schedule** for Lighthouse configuration builds would need to be established: Work is underway to meet with the CIO team to identify these needs. NOTE: Governance Framework currently identifies a 10-year retention period, which was approved in August 2021.
 - » **Monitoring** of Lighthouse will need to be properly documented: Work is in progress to address feedback mechanisms, monitoring and engagement of risk assessment activities, and overall performance of the tool as it relates to biases. NOTE: These are also being addressed in key governance documents including the Algorithmic Impact Assessment and Gender-Based Analysis Plus.

Legal

»

Communication and public environment

» Communications implications:

»

»

- » **External stakeholder consultation:** As part of ongoing analysis of the AIA and GBA+, IRCC will continue external engagement with key partners, such as Statistics Canada.

Impact Analysis

- » Lighthouse falls within the scope of the *TBS Directive on Automated Decision-Making*:
 - » An Algorithmic Impact Assessment was completed and currently being finalized for senior level approvals and publishing.
 - » Publication date to be confirmed with SPP and Communications.
 - » A Gender Based Analysis Plus analysis was also completed.
 - » While the target population is representative of all, Lighthouse excludes gender as an identifiable element; therefore, it is not expected that any one group would be differentially impacted.

Summary of actions and mitigation measures

Impact areas / Considerations

- ✓ Algorithmic Impact Assessment
- ✓ GBA Plus
- Privacy Model Assessment
- Data (availability, quality, sharing)
- Communications (public scrutiny)
- Legal considerations
- Technical complexity/novelty
- Resources/cost

Actions / Mitigations / Requirements

- Completed. Publish date: August 2022
- Completed.
- In progress; July 2022
- Ongoing
- Comms Strategy; July 2022
- In progress; August 2022
- Ongoing
- Continued support from OPPB for maintenance and tool performance

Forward plan

Key milestones:

- | | |
|---|--------------------------|
| » Presentation to SMM Ops | April, 22, 2022 |
| » DGSC Intake | July 7, 2022 |
| » Approval of AIA and GBA | July 7, 2022 |
| » Approval of Model Privacy Assessment | July 2022 (TBC) |
| » Presentations to Corporate Governance | August 2022 (TBC) |
| » ADM Memo | August 2022 (TBC) |

Return to DGSC for approval to launch

August 2022 (TBC)

Target date for launch

September 2022

Decision points

- ☐ Agreement on scope, prioritization and timelines
- ☐ Additional actions/mitigations/requirements identified (other assessments, higher approval level, additional DGSC check-in, other governance committee stops?)
- ☐ Approval to proceed



Immigration, Refugees
and Citizenship Canada

Immigration, Réfugiés
et Citoyenneté Canada

Director General Steering Committee

Governance of artificial intelligence, advanced analytics and automation decision support initiatives

PRE-LAUNCH APPROVAL

Lighthouse

Steady State Launch to Temporary Resident Programs

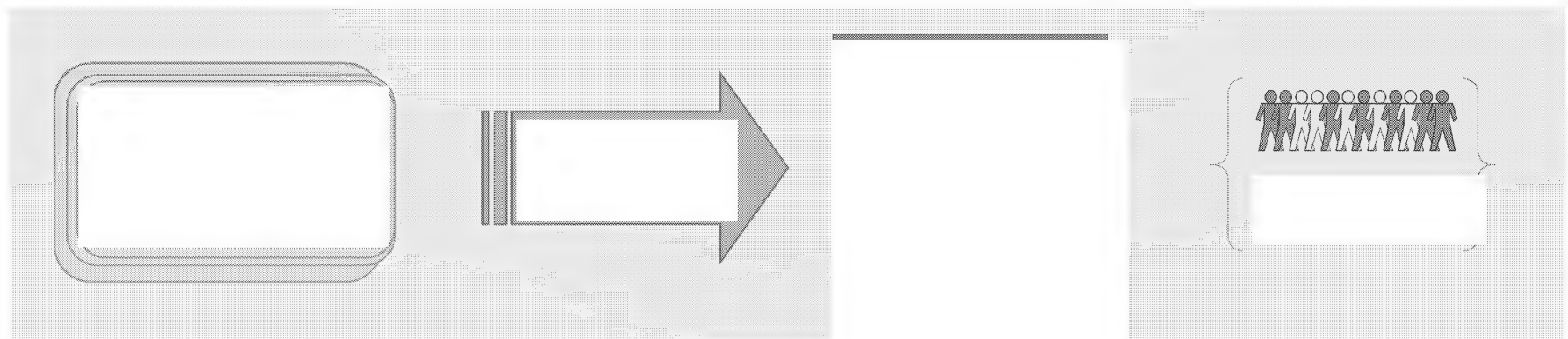
Integrity Risk Management Branch

August 31, 2022

s.16(1)(b)

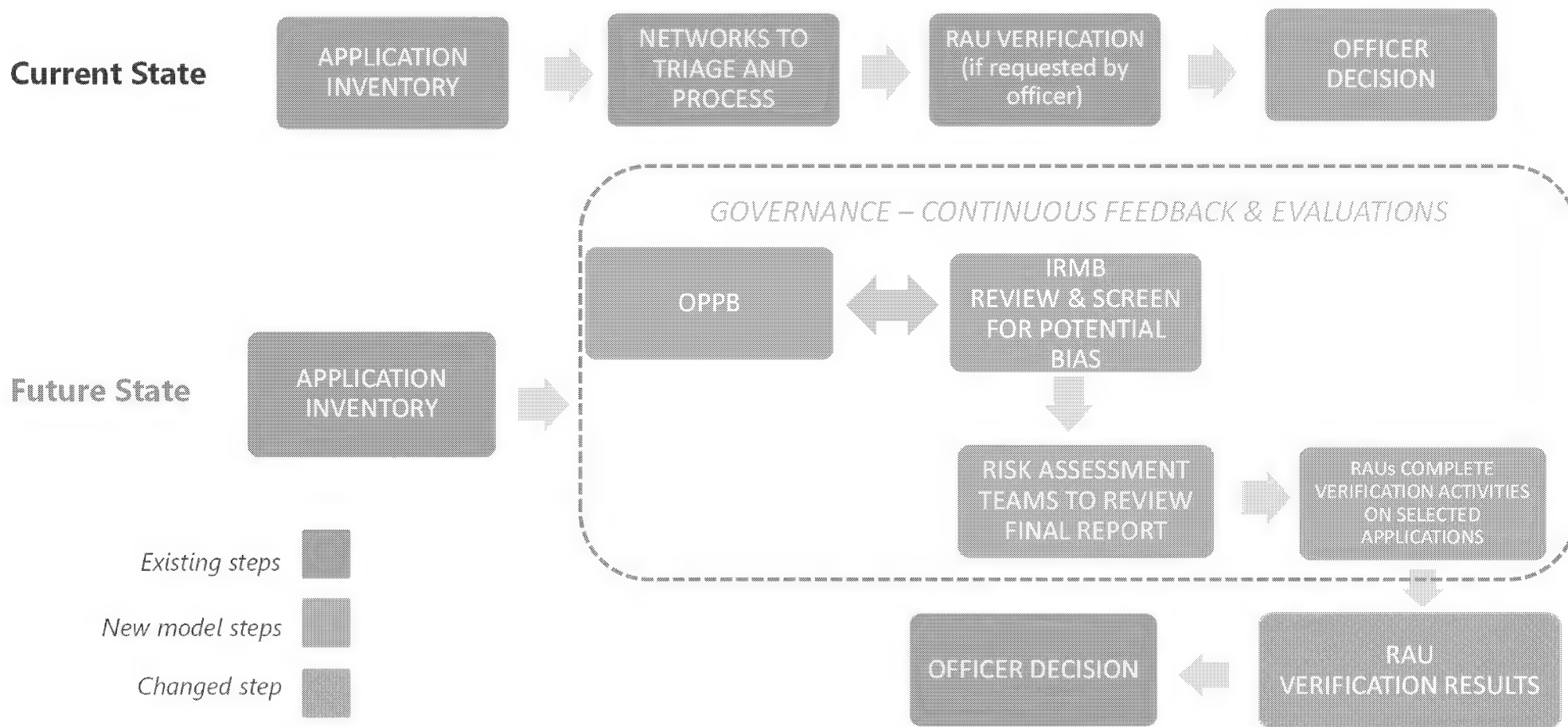
Model Overview

Within global caseloads, Lighthouse automatically and systematically identifies pockets of connected applications with a high incidence of adverse events



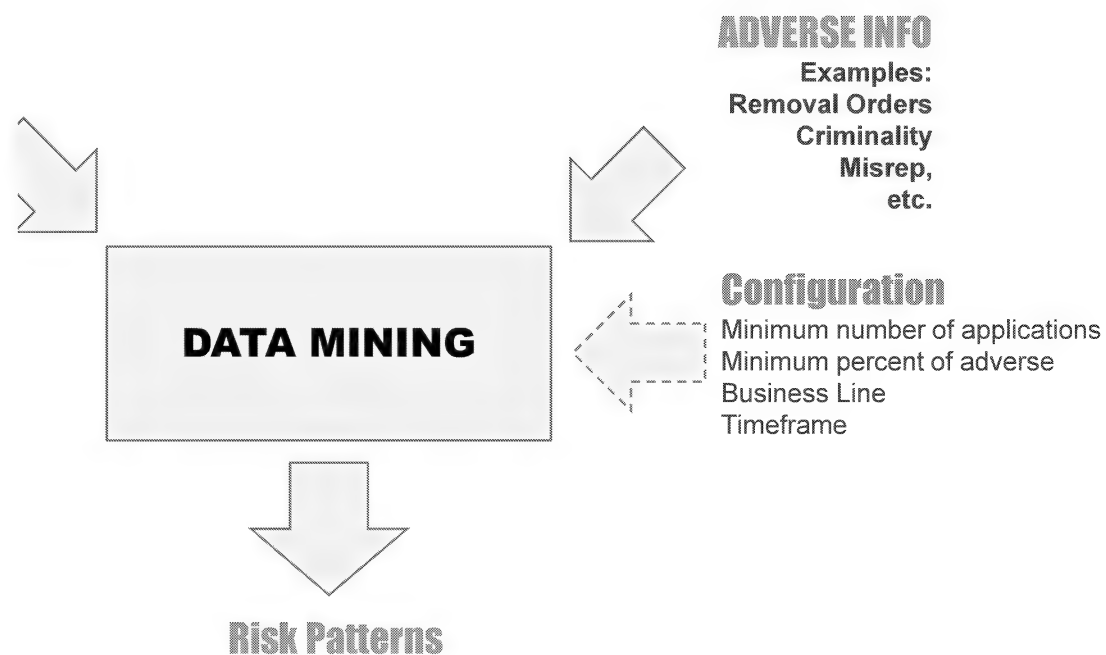
Process: Before and After

Lighthouse dovetails with existing intelligence-based risk detection approaches.



s.16(1)(b)

Model rules: Basic Operation



s.16(1)(b)

Model rules: Data

All data points used by Lighthouse serves one of three purposes:

INPUTS

ADVERSE TARGETS

Variable indicating if the applicant has a specific adverse type (e.g., criminality)

CONTEXTUAL INFORMATION

s.16(1)(b)

Model rules: Output (Contextual Information)

Once patterns have been identified, a variety of supplementary information is supplied to users to help contextualize a pattern:

- **Adverse Summary:** How many applications meeting the pattern have adverse info? What is the breakdown by type of adverse?
- **Timing:**
-
-
- **Text:**

Key findings: Algorithmic Impact Assessment

- » The AIA for Lighthouse was developed by IRM and OPPB; stakeholders across IRCC were consulted.

Impact Level	2* (Moderate Impact)
Current Score	30
Raw Impact Score	30
Mitigation Score	34

**The impacts of automating an administrative decision are classified into 4 levels, ranging from Level I (little impact) to Level IV (very high impact). Impact levels are distinguished based on criteria of reversibility and expected duration: automated decisions with little to no impact are reversible and brief, while those with a very high impact are irreversible and perpetual.*

- » **Lighthouse is not a decision-making tool.** Decision-making continues to rest with officers.
- » IRCC's primary data partners, Global Case Management System (GCMS) and Enterprise Data Warehouse (EDW), follow processes to ensure that only relevant and reliable data is used. GCMS has rigorous processes for ensuring the reliability of data used in application processing.
- » A governance framework for Lighthouse exists that outlines how the system will be managed and maintained responsibly.

Key findings: GBA Plus

- » IRM completed a GBA Plus analysis in May of 2022, the analysis assessed the potential for bias and differential impacts when using the Lighthouse risk identification tool.

Mitigations

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Processing Delays – to avoid processing delays, applications are assessed against historical patterns of concern at the very front of the process, when an application is first received by IRCC.

Refusal Likelihood – to avoid fettering of officer decisions and any negative impact on the client via a reduced likelihood of being approved, the process is designed to ensure that decision-making officers will not have access to Lighthouse-derived risk information.

Inequality (e.g., racism, sexism, etc.) - Lighthouse treats applications from different countries, gender, and age groups in a manner generally consistent with the historical risk of adverse information being found in applications from those groups.

Data

Lighthouse was “trained” to identify patterns of concern on 799,000 student permit applications received by IRCC between January 1, 2019, to December 31, 2020 (“training set”) to evaluate the historical bias assessment.

Examined the following indicators:

Gender: Rate of Adverse Applications vs. Rate of Lighthouse Pattern Matches

Country of Residence: Rate of Adverse Applications vs. Rate of Lighthouse Pattern Matches

Age: Rate of Adverse Applications vs. Rate of Lighthouse Pattern Matches

Based on the test set analysis, applications matched by Lighthouse aligned relatively well with the underlying risk distribution in the general caseload.

IRM will continue to monitor and review the tool’s output for any real or perceived bias.

s.21(1)(a)

s.21(1)(b)

QA and Monitoring Plan

IRM, in collaboration with A2SC and the integrated Network, will:

- » Conduct ongoing reviews of the risk indicator **weekly** reports provided by A²SC. The review will act as an oversight function to screen for any unintended bias in the tool's output.
- » Monitor and report to A²SC on the suitability of the risk indicators based on various factors, such as context, recency, frequencies, and potential biases, when required.
 - A feedback mechanism on risk information will be provided to the Networks and other relevant stakeholders so that continuous engagement and expertise are shared to ensure configurations and tool are performing adequately and accordingly.

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s.21(1)(a)

s.21(1)(b)

Communications Plan

» Communications implications:

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- » **External stakeholder consultation:** As part of ongoing analysis of the AIA and GBA+, IRCC will continue external engagement with key partners, such as Statistics Canada.

Summary of actions and mitigation measures

Impact areas / Considerations

- ✓ Algorithmic Impact Assessment
- ✓ GBA Plus
- ✓ Privacy Model Assessment
- Data (availability, quality, sharing)
- ✓ Communications
- ✓ Legal considerations
- ✓ Technical complexity/novelty
- ✓ Resources/cost

Actions / Mitigations / Requirements

- Completed; publish date: August 2022
- Completed; June 2022
- Completed; August 2022
- Ongoing
- Comms Light-touch Strategy; August 2022
- Ongoing
- Continued support from OPPB for maintenance and tool performance
- Existing resources within IRM, OPP and Networks will be used

s.21(1)(a)

s.21(1)(b)

Next Steps and Timelines

Launch Requirements:

- » DGSC Approval of Proposal, AIA, GBA+ and MPA
- » ADM Memo – Approval of launch and AIA

August 31, 2022
September 2, 2022

Training:

- » Training / Info Sessions to RAUs

Week of September 6

Target dates for launch / roll-out:

- » Students – September 2022
- » Workers – November 2022
- » Visitors – January 2023

September 12, 2022

»

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Decision points

- ☐ Concurrence with phased roll-out timelines
- ☐ Additional actions/mitigations/requirements identified
 - ☐ Other assessments, higher approval level, other governance committee presentations
- ☐ Approval to launch

Executive Committee Comité exécutif

Integrity Trend Analysis Tool Outil d'analyse des tendances en matière d'intégrité

*Launch to Temporary Resident Programs
Lancement dans les programmes de résidents temporaires*

**LAUNCH APPROVAL
ABBROPATION DU LANCEMENT**

Operations Sector
Secteur des Opérations
December 7 - 7 décembre 2022

Risk Assessment Landscape and Gaps

Current landscape

- Officers in the field use risk indicators to inform decision-making based on known eligibility and admissibility fraud trends
 - Risk indicators are developed via local knowledge, targeted integrity exercises, business intelligence from partners, large-scale trend analysis
- Risk assessment units (RAUs) across the integrated network undertake anti-fraud verifications on the basis of officer referrals. Officer referrals are based on experience, judgement, knowledge of local conditions
 - Verifications involve open source intelligence, phone verifications, verifications with third parties, site visits/interviews

Challenges with existing approach

- No means to leverage vast data holdings in GCMS to responsively develop risk-based processing guidance
- No systematic way to share case-specific risk information to individual officers
- Models and assumptions which govern automation, bulk processing, and other facilitative processing approaches cannot respond to evolving risks in real time

We're not making best use of the data we have on known risks in our caseload to maximize efficient decision-making.

Vision future – Outil d'analyse des tendances en matière d'intégrité

Le succès selon l'analyse d'intégrité des tendances

- Utiliser les tendances dans nos données pour détecter la fraude jusqu'alors inconnue en permettant des connections que les officiers individuels ne peuvent observer
- L'identification des tendances de risque pour les dossiers ouverts en temps réel et basé sur des données
- Une meilleure détection du risque permet au Ministère d'expérimenter en confiance avec les approches de traitement facilitatrices pour les clients à faible risque, en sachant que les risques sont contrôlés.

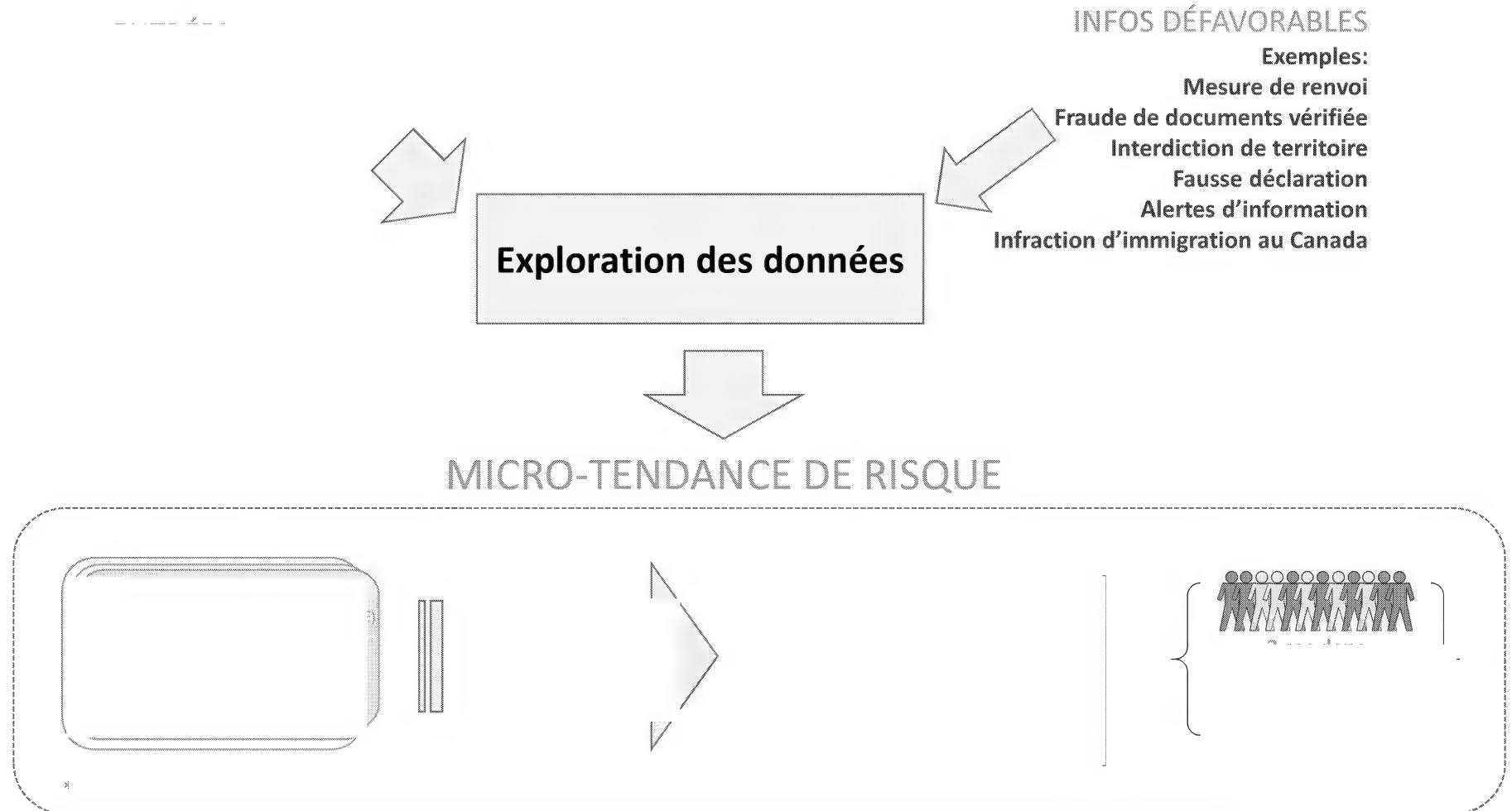
Comment on y arrive?

- **L'Outil d'analyse des tendances en matière d'intégrité (OATI)** est un outil d'exploration de données développé par l'IRCC qui utilise des analyses avancées (AA) afin d'extraire des tendances de risque ou de dans une ligne d'affaire donnée, selon les données du SMGC.
- Mesurer ces tendances permet à l'IRCC de définir précisément la tolérance de risque, et d'ajuster cette tolérance selon l'évolution des tendances. Alors que nous devenons plus sophistiqués dans notre approche au risque, nous pouvons mieux calibrer le niveau d'effort dans le traitement des cas, selon les risques acceptables vs. inacceptables.
- En avance du MPN3, la capacité de l'OATI à identifier activement les demandes requérant une revue en profondeur, versus celles qui représentent un plus faible risque, est fondamental pour soutenir la vision de l'IRCC du traitement individualisé des voyageurs.

La décision de lancer l'OATI est nécessaire pour avancer cette vision.

s.16(1)(b)

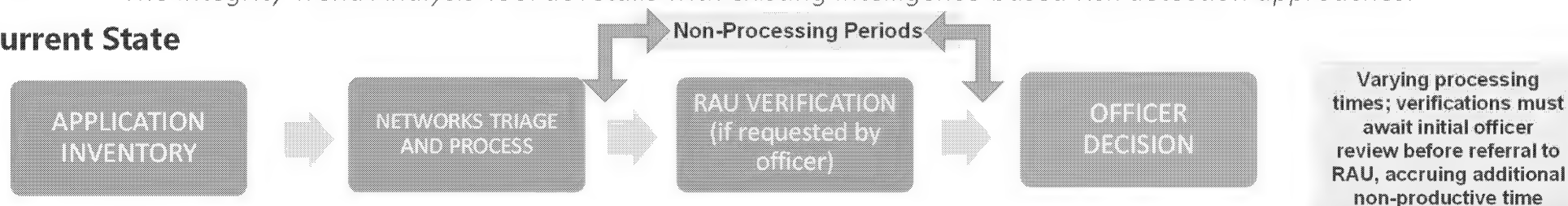
OATI: Opération de l'outil



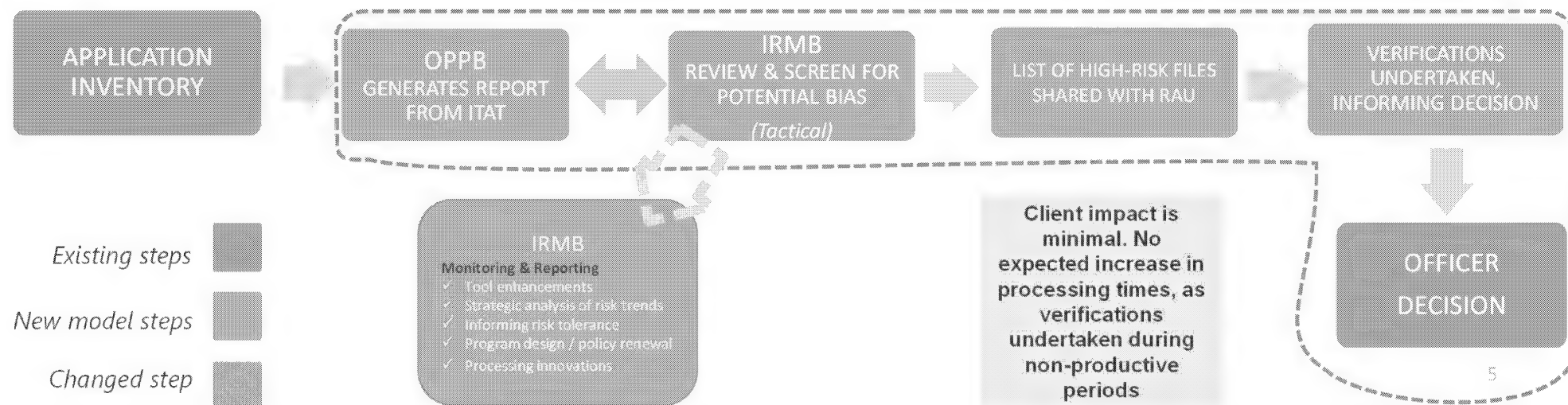
Process: Before and After

The Integrity Trend Analysis Tool dovetails with existing intelligence-based risk detection approaches.

Current State



Future State



Model Pilot Results: Study Permits

Manual Verifications (not involving ITAT)

- **Adverse Rate:** ~9% for applications selected for verification without ITAT.
- Referrals for anti-fraud verification rely on officer experience/judgement, or are selected for Targeted Integrity Exercise.
- **Client Impacts:** Varying processing times, based on when verification results are available. Verifications with no adverse findings help inform risk trends, but may increase processing times for genuine applications which are selected for verifications.

Study Permit Pilot #1 (July to September 2020)

- **Adverse Rate:** ~18% for applications selected for verification using ITAT
- **Lessons Learned:** ITAT uncovered previously unknown fraud trends and allowed Risk Assessment Units to focus efforts on meaningful verification activities based on patterns of interest, resulting in timelier verification results and decision making.
- **Client Impacts:** Improved processing times for files requiring verification; fewer genuine applications selected for verifications.

Study Permit Pilot #2 (September to December 2021)

- **Adverse Rate:** ~33% for application selected for verifications using ITAT
- **Lessons Learned:** ITAT enabled Risk Assessment Units to proactively perform verifications and achieve fraud detection rates considerably higher than under existing process.
- **Client Impacts:** Improved processing times for files requiring verification; fewer genuine applications selected for verifications.

Capacités de l'outil

Ce qu'il fait:

- ✓ Personnalisable, flexible, et adaptable à n'importe quelle ligne d'affaire
- ✓ Identifie les liens forts aux dénouements défavorables pour enquête plus approfondie
- ✓ Analyse presque toutes formes de tendances de risque identifiable par les données
- ✓ Configuration pour certains types de risque: fausse déclaration, vérifications qui ont décelées la fraude, renvois, exécution de la loi, criminalité
- ✓ Soutien l'automatisation, le traitement en groupe, et autres innovations

Ce qu'il ne fait pas:

- × Identification des demandes à faible risque pour traitement
- × Automatisation des prises de décision
- × Partage de l'information directement avec les agents décideurs
- × Identification des demandes pour refus à base de 'bonne foi' (e.g. intention de quitter le Canada, fonds disponibles)
- × Baser les tendances de risque sur des demandes aux taux de refus plus élevés (sans infos défavorables documentées)
- × Détection de toutes les tendances de risque

Key findings: GBA Plus, Diversity and Inclusion

- » IRM completed a GBA Plus analysis in May 2022. The analysis assessed the potential for bias and differential impacts when using the Integrity Trend Analysis Tool.
- » If approved, the methodology for identifying institutional bias (Differential Outcomes Framework) will provide guidance to help ensure any bias is not perpetuated.

Mitigations Do No Harm Design

Processing Delays – to avoid processing delays, applications are assessed against historical patterns of concern at the very beginning of the process, when an application is first received by IRCC.

Refusal Likelihood – to avoid fettering of officer decisions and any negative impact on the client via a reduced likelihood of being approved, the process is designed to ensure that officers continue to make informed decisions based on the information provided in the application and the verification results.

Inequality (e.g., racism, sexism, etc.) – applications from different countries, gender, and age groups are treated in a manner generally consistent with the historical risk of adverse information being found in applications from those groups.

Data Potential differential outcomes

Refusals supported by this analysis are based on validated instances of fraud/criminality/malfeasance, **not suspicion**. Often, once significant fraud trends are interrupted, refusal rates subsequently decrease, as knowledge amongst bad actors spreads that fraudulent applications will be intercepted.

Characteristics of applications identified through ITAT aligned with the underlying risk distribution in the general caseload.

IRM will continue to monitor and review the tool's output for any real or perceived bias, and adjust the tool's parameters if unjust differential outcomes are observed.

Évaluation de l'incidence algorithmique et plan de l'AQ

Évaluation de l'incidence algorithmique

L'évaluation de l'incidence algorithmique (EIA):

Une évaluation de l'incidence algorithmique (EIA) pour l'outil a été élaborée en consultation avec des intervenants partout au Ministère. L'outil a reçu un niveau d'incidence de **2 sur 4 (modéré)**

L'outil n'est pas **un outil décisionnel**. La prise de décisions continue d'être la responsabilité des agents. Les données utilisées sont en provenance de l'SMGC, qui comporte des processus rigoureux pour assurer la fiabilité des données.

Consultation externe: Le SCT exige que les outils d'analyse avancés de niveau 2 soient soumis à un examen des pairs. À ce but, Statistique Canada a déjà complété un examen de l'outil.

Il existe un cadre de gouvernance pour l'outil qui décrit comment le système sera géré et maintenu de façon responsable. **Le cadre de gouvernance portant sur les outils d'analyses avancés** a été suivi pendant le développement et pilotage de l'outil.

Plan de l'AQ

En collaboration avec le DGPRO et le réseau intégré, la GRI devra :

Mener des examens continus des rapports **hebdomadaires** sur les indicateurs de risque. L'examen servira de fonction de surveillance pour détecter tout biais non intentionnel dans les résultats de l'outil.

Surveiller la pertinence des indicateurs de risque et en faire rapport au DGPRO en fonction de divers facteurs, comme le contexte, la mise à jour, la fréquence et les biais potentiels, au besoin.

s.21(1)(a)

s.21(1)(b)

Plan de communication

» Répercussions sur les communications :

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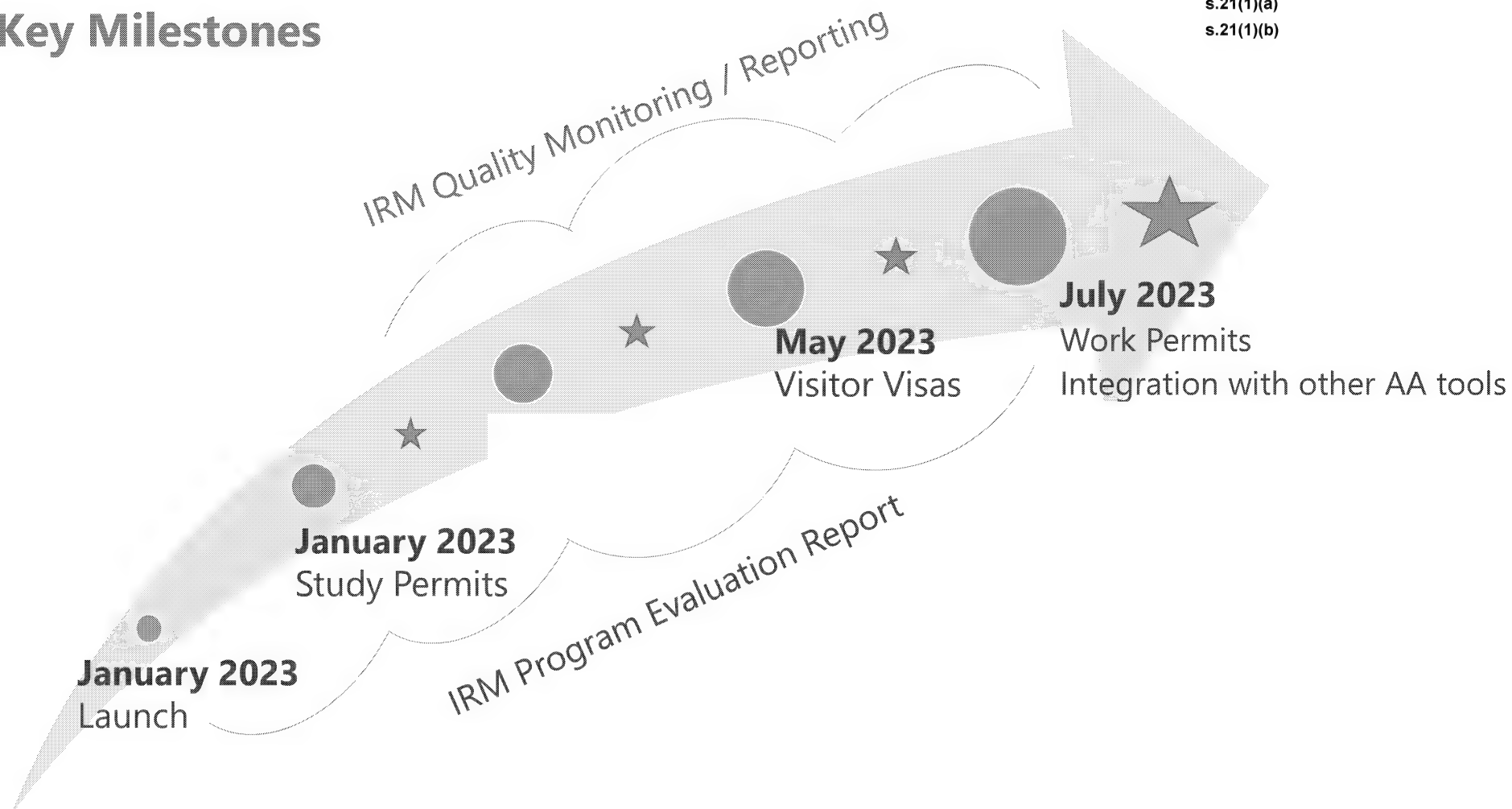
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Key Milestones



s.21(1)(a)
s.21(1)(b)

Decision points

- ☐ Approval to launch
- ☐ Concurrence with phased roll-out timeline

Annexe: Principales constatations : Évaluation de l'incidence algorithmique

L'évaluation de l'incidence algorithmique (EIA) pour l'outil d'analyse des tendances en matière d'intégrité a été élaborée par la Gestion des risques pour l'intégrité (GRI) et la Direction générale de la planification et du rendement des opérations (DGPRO); les intervenants d'IRCC ont été consultés.

Niveau d'incidence	2* (incidence modérée)
Note actuelle	30
Note d'incidence brut	30
Note d'atténuation	34

**Les répercussions de l'automatisation d'une décision administrative sont classées en quatre niveaux, allant du niveau I (incidence minime) au niveau IV (incidence très élevée). On distingue les niveaux d'incidence en fonction de critères de réversibilité et de durée attendue ; les décisions automatisées ayant peu ou pas d'incidence sont réversibles et brèves, tandis que celles ayant une incidence très élevée sont irréversibles et perpétuelles.*



Immigration, Refugees
and Citizenship Canada

Immigration, Réfugiés
et Citoyenneté Canada

Issues Management Committee

PRE-LAUNCH APPROVAL

Lighthouse – Advanced Analytics Integrity Tool

Steady State Launch to Temporary Resident Programs

Integrity Risk Management Branch
November 1, 2022

Risk Assessment Landscape and Gaps

Current landscape

- Officers use risk indicators to inform decision-making based on known eligibility and admissibility fraud trends
- Risk assessment units undertake anti-fraud verifications on the basis of officer referrals. Referrals are based on experience, judgement, knowledge of local conditions
 - Verifications involve open source intelligence, phone verifications, verifications with third parties, site visits/interviews

Challenges with existing approach

- No means to leverage vast data holdings in GCMS to responsively develop risk-based processing guidance
- No systematic way to share risk information to individual officers
- Risk trend information not systematically available to officers

What Success Means for Lighthouse

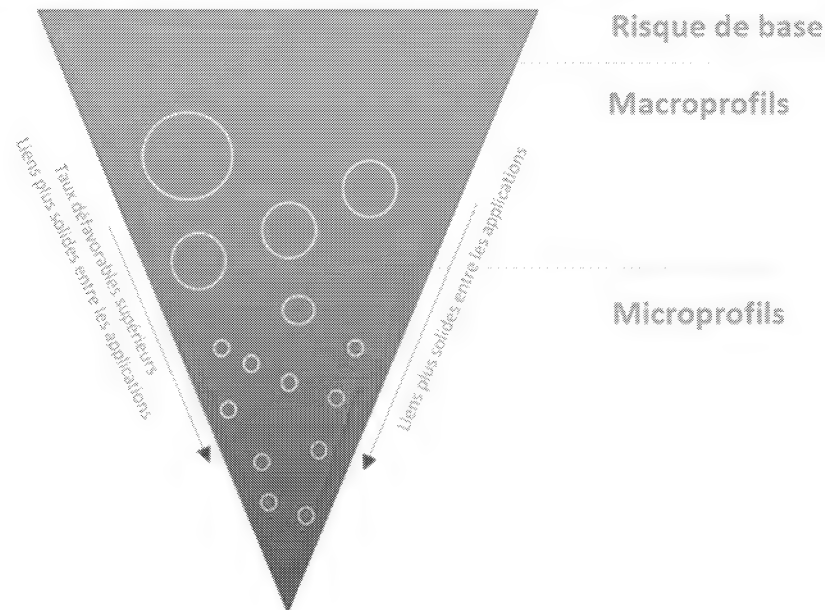
- Real-time, evidenced-based identification of admissibility risk trends in live case loads
- Maximize value of risk assessment units efforts to uphold program integrity
- A responsible risk backstop that facilitates innovative processing approaches

s.16(1)(b)

Modèle Lighthouse

Lighthouse est un prototype d'outil d'exploration de données qui extrait de façon exhaustive les profils de risque et de fraude relatifs aux données pour tout secteur d'activité pertinent.

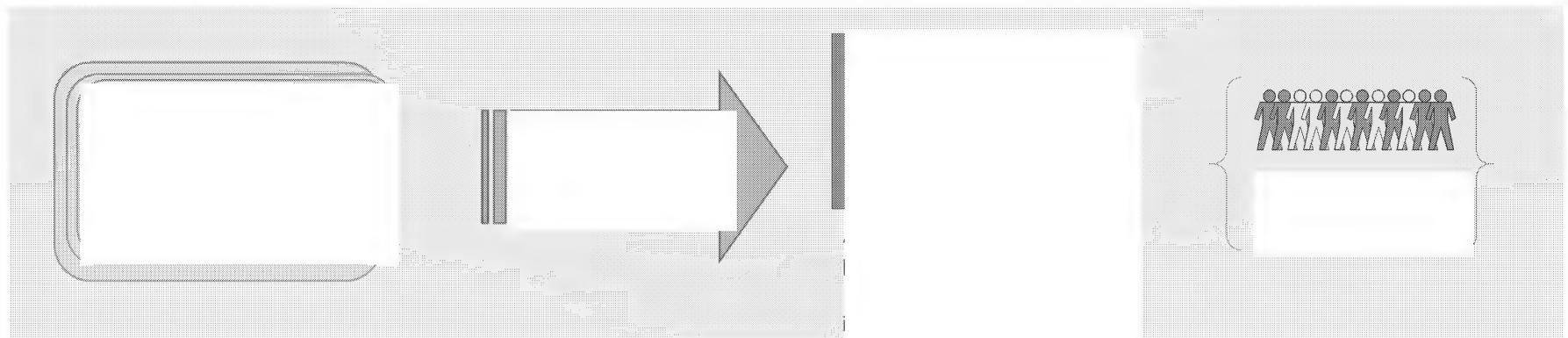
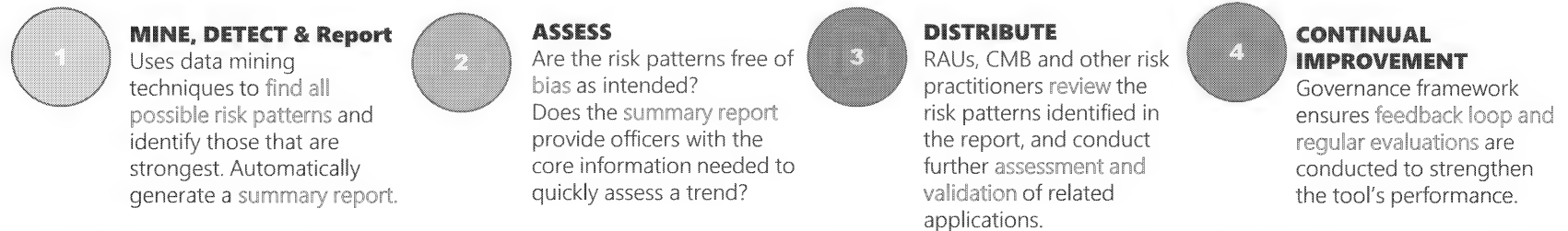
Lighthouse détecte les profils de risque au niveau micro et macro



Cette image montre comment Lighthouse détecte les profils de risque au niveau micro et macro. Les microprofils sont rattachés à des clients à risque élevé, et ils sont déterminés par des liens solides entre d'autres applications. La plupart des applications sont au niveau de la base, puisqu'elles sont à faible risque.

Model Overview

Within global caseloads, Lighthouse automatically and systematically identifies pockets of connected applications with a high incidence of adverse events



Lighthouse's Capabilities

What it does do:

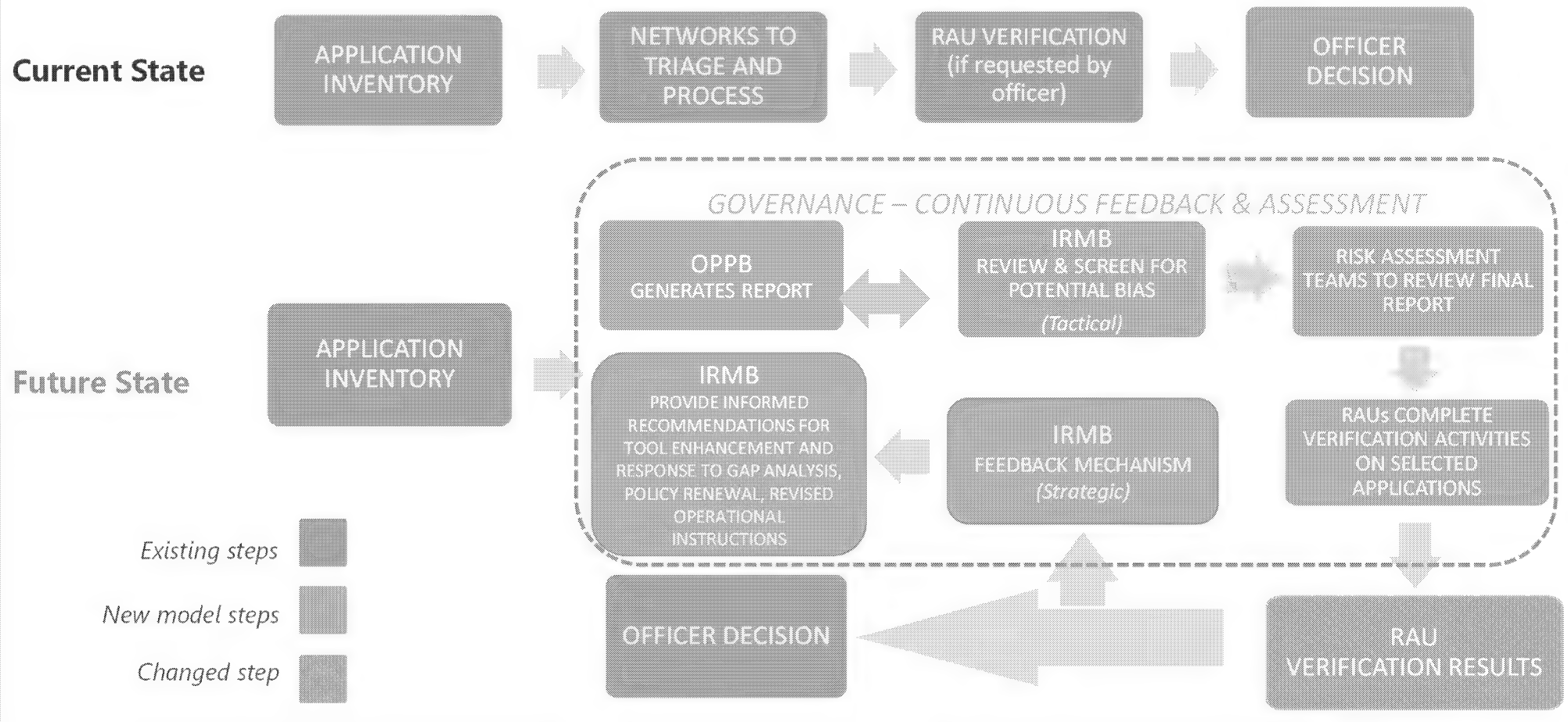
- ✓ Customizable, flexible and adaptable to any IRCC business line
- ✓ Identifies strong links to adverse outcomes for further investigation
- ✓ Scans for almost all forms of data-detectable risk patterns
- ✓ Configured to specific risk types: misrepresentation, adverse verifications, removals, in-Canada enforcement, criminality
- ✓ Supports effective processing

What it does not do:

- × Identifies low-risk applications for processing
- × Automates decision making
- × Shares info directly with decision making officers
- × Identifies applications for refusals on based bona fides (i.e. intent to leave Canada, available funds)
- × Bases risk patterns off applications with higher refusal rates (without documented adverse info)
- × Finds all risk trends

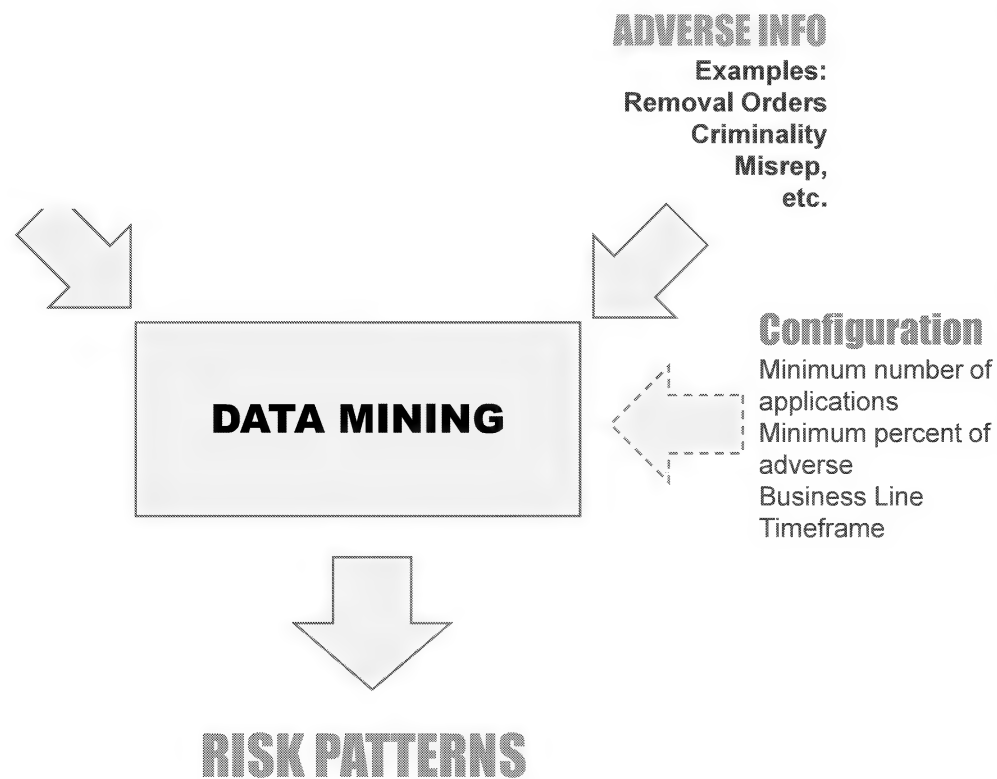
Process: Before and After

Lighthouse dovetails with existing intelligence-based risk detection approaches.



s.16(1)(b)

Model rules: Basic Operation



Piloting Lighthouse - Study Permits

Manual
Verifications
(not involving
Lighthouse)

- ~9% adverse rate for applications selected for verification without LH.
- Verification referrals rely on officer experience/judgement, or are selected for Targeted Integrity Exercise.

Study Permit
Pilot #1
(July to
September
2020)

- ~18% adverse rate for applications selected for verification using LH had at least 1 adverse finding (e.g. fraud), and contributed to the discovery of previously unknown fraud trends.

Study Permit
Pilot #2
(September to
December
2021)

- ~33% adverse rate for application selected for verifications using LH had at least 1 adverse finding (e.g. fraud), which is considerably higher than without LH.

Principales constatations : Évaluation de l'incidence algorithmique

- » L'évaluation de l'incidence algorithmique (EIA) pour Lighthouse a été élaborée par la Gestion des risques pour l'intégrité (GRI) et la Direction générale de la planification et du rendement des opérations (DGPRO); les intervenants d'IRCC ont été consultés.

Niveau d'incidence	2* (incidence modérée)
Note actuelle	30
Note d'incidence brut	30
Note d'atténuation	34

**Les répercussions de l'automatisation d'une décision administrative sont classées en quatre niveaux, allant du niveau I (incidence minime) au niveau IV (incidence très élevée). On distingue les niveaux d'incidence en fonction de critères de réversibilité et de durée attendue ; les décisions automatisées ayant peu ou pas d'incidence sont réversibles et brèves, tandis que celles ayant une incidence très élevée sont irréversibles et perpétuelles.*

- » **Lighthouse n'est pas un outil décisionnel.** La prise de décisions continue d'être la responsabilité des agents.
- » Les principaux partenaires en matière de données d'IRCC, le Système mondial de gestion des cas (SMGC) et l'entrepôt de données d'entreprise (EDE), suivent des processus afin de s'assurer que seules des données pertinentes et fiables sont utilisées. Le SMGC comporte des processus rigoureux pour assurer la fiabilité des données utilisées dans le traitement des demandes.
- » Il existe un cadre de gouvernance pour Lighthouse qui décrit comment le système sera géré et maintenu de façon responsable.

s.21(1)(a)
s.21(1)(b)

Key findings: GBA Plus, Diversity and Inclusion

- » IRM completed a GBA Plus analysis in May of 2022, the analysis assessed the potential for bias and differential impacts when using the Lighthouse risk identification tool.
- » If approved, the Methodology for Identifying Institutional Bias (Differential Outcomes Framework) will provide guidance to help ensure any bias is not perpetuated.

Mitigations Do No Harm Design

Processing Delays – to avoid processing delays, applications are assessed against historical patterns of concern at the very front of the process, when an application is first received by IRCC.

Refusal Likelihood – to avoid fettering of officer decisions and any negative impact on the client via a reduced likelihood of being approved, the process is designed to ensure that decision-making officers will not have access to Lighthouse-derived risk profiles.

Inequality (e.g., racism, sexism, etc.) – applications from different countries, gender, and age groups are treated in a manner generally consistent with the historical risk of adverse information being found in applications from those groups.

Data Potential differential outcomes

Refusals supported by Lighthouse are based on validated instances of fraud/criminality/malfeasance, **not suspicion**. Often, once significant fraud trends are interrupted, refusal rates subsequently decrease, as knowledge amongst bad actors spreads that fraudulent applications will be intercepted.

Applications matched by Lighthouse aligned well with the underlying risk distribution in the general caseload.

IRM will continue to monitor and review the tool's output for any real or perceived bias, and adjust the tool's parameters if unjust differential outcomes are observed.

Cadre de risque - Plan de l'AQ

En collaboration avec le CSA2 et le réseau intégré, la GRI devra :

- » Mener des examens continus des rapports **hebdomadaires** sur les indicateurs de risque fournis par le CSA2. L'examen servira de fonction de surveillance pour détecter tout biais non intentionnel dans les résultats de l'outil.
- » Surveiller la pertinence des indicateurs de risque et en faire rapport au CSA2 en fonction de divers facteurs, comme le contexte, la mise à jour, la fréquence et les biais potentiels, au besoin.
 - Un mécanisme de rétroaction sur les renseignements liés aux risques sera mis à la disposition des réseaux et d'autres intervenants pertinents afin que l'engagement et l'expertise continus soient partagés, et ce, pour veiller à ce que les configurations et les outils fonctionnent adéquatement et en conséquence.

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s.21(1)(a)

s.21(1)(b)

Plan de communication

» Répercussions sur les communications :

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» **Consultation des intervenants externes** : Dans le cadre de l'analyse continue de l'EIA et de l'ACS+, IRCC poursuivra son engagement externe auprès de partenaires clés, comme Statistique Canada.

Summary of actions and mitigation measures

Impact areas / Considerations

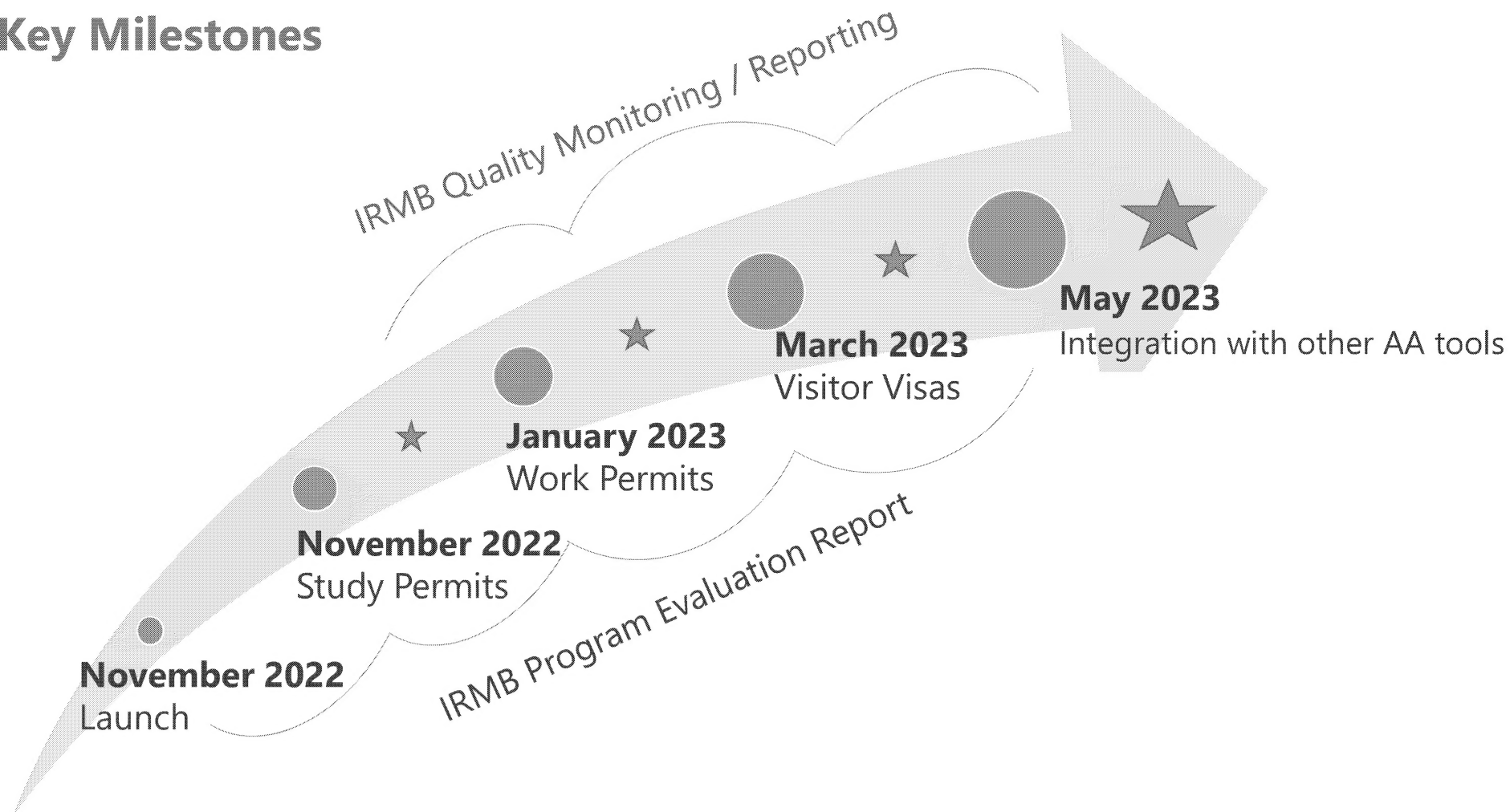
- ✓ External Peer Review: Statistics Canada
- ✓ Algorithmic Impact Assessment
- ✓ GBA Plus
- ✓ Privacy Model Assessment
- ✓ Data (availability, quality, sharing)
- ✓ Communications
- ✓ Legal considerations
- ✓ Technical complexity/novelty
- ✓ Resources/cost

Actions / Mitigations / Requirements

- Completed; 2021
- Completed; publish date: September 2022
- Completed; June 2022
- Completed; August 2022
- Ongoing (continuous monitoring)
- Completed; August 2022
- Completed; August 2022
- Continued support from OPPB for maintenance and tool performance
- Existing resources within IRM, OPP and Networks will be used

s.21(1)(a)
s.21(1)(b)

Key Milestones



Decision points

- ☐ Approval to launch
- ☐ Concurrence with phased roll-out timelines
- ☐ Additional actions/mitigations/requirements identified